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STORMWATER MANAGEMENT REPORT

EXHIBIT 10

Proposed Registered Marijuana Dispensary

8 Millennium Drive Grafton, Massachusetts



Assessors Map 110 Parcel 005.0-0000-0001.J

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Prepared For:

PLANNING BOARD GRAFTON, MA

Nature's Remedy of Massachusetts, Inc. 497 Hookset Road, Suite 190 Manchester, NH 03104

May 8, 2017



2016-063

STORMWATER MANAGEMENT REPORT

Nature's Remedy of Massachusetts, Inc. 8 Millennium Drive Grafton, Massachusetts

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PROJECT DESCRIPTION

The project proposed is a new 32,500 s.f. medical marijuana facility with paved parking and access drives located at 8 Millenium Drive in Grafton, Massachusetts, shown as assessors map 110 parcel 005.0-0000-0001.J. The 10.6 acre lot is currently undeveloped and wooded. The new building will be primarily greenhouses but will also include processing and a retail sale facility. The facility will be serviced by municipal water, sewer (force main), and gas connections.

This project has been designed with a low-impact, open drainage system using no catch basins or manholes. Surface runoff is collected and routed with swales to the stormwater management basin.

According to the July 4, 2011 FEMA map 25027C0827E, there is no 100-year flood boundary (Zone A) on the site.

DATA SOURCES

Soil test pits were conducted by Charles Gross and Heritage Design Group. Topographic survey was conducted by others. FEMA flood mapping was used for flood boundary information. Grafton zoning regulations were used to determine requirements for lot area, frontage, and setbacks.

STORMWATER MANAGEMENT REQUIREMENTS

The project will entail construction of a new building and paved surfaces on a site that is currently wooded. This will result in an overall increase in volume and peak rates of storm water runoff from the site that will require mitigation through the use of best management practices. A sediment forebay, a sand filter, and an infiltration basin are proposed to achieve the required TSS removal from the storm runoff and provide groundwater recharge. Peak runoff rates from the site will be reduced within the stormwater management basin.

COMPLIANCE WITH DEP STANDARDS

Standard 1 - Untreated Storm water

Any new storm water conveyances will not discharge untreated stormwater into wetlands or cause erosion to wetlands. A new stormwater management basin will be constructed for collection, treatment and infiltration of stormwater from paved and roof areas. The basin will discharge only treated stormwater to wetlands areas at outlets with riprap erosion controls.

Standard 2 - Post-Development Peak Rates

A hydrologic analysis conducted with Hydrocad software and TR20 methodology demonstrates that predevelopment peak flow rates from the site are maintained with post development mitigation. Type III, 24-hour duration storms were used to estimate peak flows at the analysis points (wetlands on western property boundary) for the 2, 10, 25 and 100-year statistical frequency events.

The analysis was limited to watershed areas that changed with proposed development. Watersheds that change only by loss of area were not analyzed, as peak runoff rates from these areas only decreases. Calculations for time concentration (Tc) are provided where Tc is greater than the minimum value of 0.1 hour.

Existing Conditions

The NRCS has classified the soils on this site (with hydrologic soil group assignments) as Canton (B), Ridgebury (C), Scituate (C) and Whitman (D). The soil group assignments are used to establish runoff coefficients for pre- and post-development conditions in the hydrologic model, and are also used to determine the volume of runoff required to be infiltrated to comply with stormwater regulations.

In the hydrologic model the designated analysis points are identified as AP1 and AP2. The peak runoff rates at these points was estimated for existing and developed conditions. The existing tributary watersheds to these points have been delineated and numbered E1 & E2. E1 is the northern portion of the property and generates runoff from the immediate area where the new building is proposed, E2 is the southern portion of the lot where some future development may occur. Existing peak rates of runoff were calculated at the analysis points as a baseline condition for comparison to post-development rates.

Proposed Conditions

Under proposed conditions, the developed watershed D1 will be collected by swales and routed to the stormwater management basin for treatment and peak rate attenuation. Watersheds D2 and D3 will not contain any impervious surfaces so runoff from these to areas will flow directly to wetlands after development. Watershed D4 is comprised of the stormwater management basin. The stormwater system has been designed to accommodate the construction currently proposed as well as future expansion of the facility, so D1 includes impervious areas that are not currently proposed to be built.

In the storm water model, post-development watershed D1 was delineated and routed through stormwater management basin B1 as required to provide water quality treatment for runoff from paved areas, infiltration of runoff from impervious surfaces, and peak rate attenuation for larger storm events. The peak rates at AP1 were obtained by adding the peaks from D2, half of the outflow from the basin pipes, and the outflow from the larger basin spillway. The peak rates at AP2 were obtained by adding the peaks from D3, half of the outflow from the basin pipes, and the outflow from the smaller basin spillway.

By routing the runoff from the development through the stormwater management basin a reduction of peak runoff rates was obtains for all storms studied.

A comparison of pre- and post-development runoff rates is summarized as:

	frequency	2-year	10-year	25-year	100-year
Analysis Point 1	Existing – AP1	3.7	10.0	15.7	28.5
	Developed – AP1	2.3	6.2	12.5	27.5
Analysis Point 2	E-i-ti ADO				
Analysis Foult 2	Existing – AP2	2.7	8.0	13.0	24.1
	Developed – AP2	2.5	7.4	11.5	23,4

Standard 3 - Recharge to Groundwater

The roof and pavement areas proposed will be constructed in an area where runoff recharges under existing conditions so stormwater recharge is provided to offset the loss of original permeable ground surfaces to new impervious areas. Grafton regulations require 80% TSS removal prior to infiltration so the infiltration basin proposed to meet standard 3 is not used to meet Standard 4. The requisite recharge volume, in inches times the total impervious area proposed, for each hydrologic soil group is 0.35 for group B soils and 0.25 for group C soils. The stormwater system has been designed to accommodate the construction currently proposed as well as future expansion of the facility. The roof and paved areas proposed now total 76,800 s.f. and the future expansion impervious area totals 75,000 s.f., so design of the stormwater system will accommodate 151,800 s.f. of impervious area.

The minimum recharge volume required to meet existing conditions is 0.35 inches x 69,570 s.f. of B soils + 0.25 inches x 82,230 s.f of C soils = 3,742 c.f.

Runoff recharge volume is provided in the stormwater management basin below the outlet invert. The volume below elevation 394.0 is 7,049 c.f.

Calculated drawdown time Td for the infiltration basins using the Simple Dynamic method with an infiltration rate conservatively assumed at 1.0 in/hr (per Rawls): Basin depth = 2.0 ft at 7409 c.f. >> Td = 2.0 ft.depth/1.0 in/hr = 24 hours.

Standard 4 - Removal of 80% TSS

The water quality volume (wqv) requiring 80% TSS removal for the project is 1.0 inch of runoff from paved surfaces (see standard 5). For runoff collected in the stormwater management basin the paved area for construction currently proposed and future expansion totals $94,344 \, \text{s.f.}$, so that the required wqv = 1.0 in. x $94,344 = 7,862 \, \text{c.f.}$

Removal of 80% TSS is provided by the sand filter with sediment forebay pretreatment. The total treatment volume is provided as a function of the filter bed area and height of water above the filter bed. Using criteria specified in the Georgia Stormwater Management Manual (2016), the area of filter bed $A = wqv \times d / k \times (h + d) \times T$ where depth of filter bed d=1.5', average height h=1', k = 3.5 for sand, and T = drain time in days. Using T = 1.5 days, A = 920 s.f. minimum, 2400 s.f. is provided

The sediment forebay has been sized using criteria specified in the Georgia Stormwater Management Manual (2016), with required sediment basin surface area $A = 0.066 \times \text{mg} = 518 \text{ s.f.}$ Surface area provided in sediment basin = 560 s.f.

Standard 5 - Land Uses with Higher Potential Pollutant Loading (LUHPPL)

LUHPPL require treatment of 1.0 inch of runoff from paved surfaces. Although the entire site may not be classified as LUHPPL, it is an industrial site and use of the driveways and parking areas may vary with time. Therefore the runoff from the 94,344 s.f. of pavement currently proposed, and for future expansion, will be treated to meet the LUHPPL standard in the stormwater management basin.

Standard 6 - Critical Areas

The project is located within an industrial zone and is not classified as a critical area. Standard 6 does not apply.

Standard 7 - Redevelopment

This is not a redevelopment project. Standard 7 does not apply.

Standard 8 - Erosion and Sedimentation Controls

Erosion and Sedimentation Controls are proposed as part of the site work. These controls are detailed on the project plans and will be installed prior to start of work and maintained until the site is stabilized

Standard 9 - Operation and Maintenance Plan

Operation and Maintenance Plan

BMP owner: Nature's Remedy of Massachusetts, Inc.

Party responsible for operation & maintenance during construction: Nature's Remedy of Massachusetts, Inc.

Party responsible for operation & maintenance post-construction: Nature's Remedy of Massachusetts, Inc.

Inspection and Maintenance Schedule:

Pavement to be swept a minimum of two (2) times per year, or more often if required. At a minimum, sweeping will be conducted once in the spring (March/April) and once in the fall (October/November).

Sediment Forebays:

Shall be inspected at least once per month and after every major storm of 3 or more inches in a 24-hour period. Inspections shall include erosion, embankment leakage, woody growth on the embankments, riprap integrity, sediment accumulation. Sediment forebays must be cleaned four times per year AND when accumulated sediment average depth of 4" is exceeded.

Infiltration basin:

Shall be inspected two (2) times per year and after every time drainage discharges through the overflow weir. Inspections shall also occur after every major storm of 3 or more inches in a 24-hour period. Inspections shall include erosion, embankments leakage, woody growth on the embankments, riprap integrity, sediment accumulation, and turf health.

Basin side slopes and basin bottom to be mowed at least twice per year. Remove grass clippings, accumulated organic matter, trash and debris. Use deep tilling to break up clogged surfaces and revegetate immediately.

For the first 6 months after construction inspect and repair lawns after each rainfall ½" or more to ensure surface vegetation is healthy, discharge devices are not blocked, and slopes are not eroding.

A maintenance log detailing the date and result of each inspection shall be kept by the responsible party and made available to the Conservation Commission upon request. Routine maintenance as well as follow-up actions taken as a result of inspections or incidents shall be detailed and dated in the log. An inspection sheet for the log is attached.

Infiltration Basin Repair and Replacement Plan

The infiltration basin is intended for short-term storage of stormwater only. If ponding is observed within the basin longer than 48 hours after a rain event then corrective action is required. The maintenance outlet for the basin will allow the basin to be drained to allow repairs. The life cycle of the infiltration basin is entirely dependant on sediment removal from stormwater prior to the stormwater entering the basin, so it is imperative that the sediment forebay is maintained and cleaned regularly.

Initial corrective action for prolonged ponding shall entail removal of any observed sediment deposits and then deep tilling of the bottom of the infiltration bottom. The tilling must extend below the topsoil and into the sand below by at least two inches. When deep tilling is no longer effective in restoring the ability of the basin to drain, topsoil shall be removed from the basin down to the sandy soil below. The bottom of the basin will then be restored with sand to 4 inches below final grade, then brought to final grade with topsoil and seeded.

STORMWATER SYSTEM INSPECTION REPORT

Inspection Date & Time_			
Weather during inspection			
Weather information since	last inspection (if fi	rst inspection, si	nce start of construction):
Beginning of Rainfall	Duration of Rainfall (hrs)	Inches of Rainfall	Did basin discharge occur?
	a de la companya de l		
Location of BMPs requirin	g maintenance:		
agetical of DMD- C.'1'		•	
Location of BMPs failing t	o operate as designed	i or inadequate f	or location:
ocation where additional	BMPs are needed:		
vas neafe:	safe to inspect?	If yes, descri	be where and why inspecting
Corrective Action Required	<u> </u>		
- W.A.			
Jame:		Title:	
ignature:			Date:

Materials removed from forebays and infiltration basin must be disposed of in accordance with 310 CMR 19 and 310 CMR 30 as applicable.

Source Control & Pollution Prevention Plan (Long Term)

Good house keeping practices will be followed onsite during the construction project and afterwards to mitigate potential impacts of stormwater discharges. Cleaners, solvents and lubricants kept onsite will be stored in an orderly manner and under a roof or in a containment area when possible. Containers will be stored with lids on when not in use and drip pans shall be provided under dispensers. Products should be kept in their original containers with the original manufacturer's label in legible condition. Substances will not be mixed with one another unless recommended by the manufacturer. Whenever possible, all of a product will be used up before disposing of the container. Manufacturer's recommendations for proper use and disposal will be followed. Employees will be trained to follow protocol for safe use and disposal of potentially hazardous substance. The facility manager will conduct routine inspections to monitor proper use and disposal of materials.

Spill Prevention, Containment, Control & Countermeasures Plan

In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, all materials with hazardous properties such as pesticides, petroleum products, detergents, chemicals, paints, paint solvents, cleaning solvents, etc. will be stored in a secure location with their lids on, preferably under cover, when not in use. The minimum quantity of all such materials will be kept on the job site. Fertilizers will not be used at the site. A spill control and containment kit containing, at a minimum, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, and both plastic and metal trash containers will be kept at the facility and clearly labeled "spill control kit". Manufacturer's recommended methods for spill cleanup will be clearly posted and employees will be trained regarding these procedures and the location of the information and cleanup supplies.

In the event of a spill, cleanup will commence immediately upon discovery. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with hazardous substances. The facility manager will be notified immediately. Spills of toxic or hazardous materials will be reported to the appropriate federal state, and/or local government agency, regardless of the size of the spill. Spills exceeding "Reportable Quantities" of certain substances specified in federal regulations (40 CFR 110, 40 CFR 117, and 40 CFR 302) must be immediately reported to the EPA National Response Center, telephone 1-800-424-8802

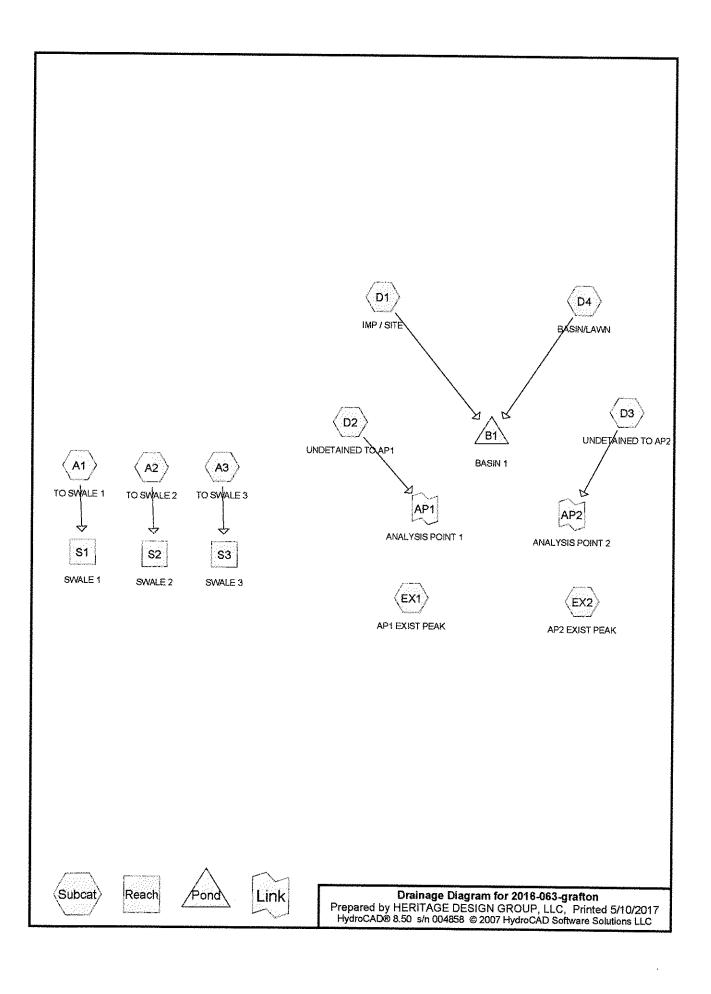
The facility manager will be the spill prevention and response coordinator. He will designate the individuals who will receive spill prevention and response training. These individuals will each become responsible for a particular phase of prevention and response. The names of these personnel will be clearly posted at a location commonly occupied by all employees, such at a lunchroom, within the facility.

Standard 10 - Illicit Discharges

There are no know illicit discharges existing at the project site and none are proposed as part of the development. Except for the proposed roof drains, the proposed drainage system is an open system and does not include any subsurface piping.

COMPUTATIONS

Hydrocad report follows. Included in this report are computations for peak runoff rate attenuation provided in the stormwater management basin as well as calculated flow rates and velocities for the grassed swales. Calculations for each grass swale include roof areas which overlap to accommodate possible variations in final roof drainage. As a result the total of the roof areas for the grassed swales is larger than actual total roof area.



Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Subcatchment A1: TO SWALE 1

Runoff

3.95 cfs @ 12.09 hrs, Volume=

13,285 cf, Depth> 7.35"

	A	rea (sf)	CN	Description							
*		12,700	98	ROOF & PA		****					
	***************************************	9,000	74	>75% Gras	>75% Grass cover, Good, HSG C						
		21,700	88	Weighted A	verage						
		9,000		Pervious A							
	12,700 Impervious Area			Area							
	Tc min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description					
	6.0					Direct Entry,					

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Summary for Subcatchment A2: TO SWALE 2

Runoff =

21.82 cfs @ 12.09 hrs, Volume=

76,206 cf, Depth> 7.95"

_	Area (sf)	CN	Description							
-	92,000 23,000	98 74		ROOF & PAVEMENT 75% Grass cover, Good, HSG C						
	115,000 23,000 92,000	93	Weighted A Pervious Ar Impervious	ea						
_	Tc Length (min) (feet)	Slop (ft/	,	Capacity (cfs)	Description					
	6.0				Direct Entry.					

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Summary for Subcatchment A3: TO SWALE 3

Runoff = 8.23 cfs @ 12.09 hrs, Volume=

26,801 cf, Depth> 6.62"

	Area (sf)	CN	Description							
**	16,600 32,000	98 74	ROOF & PAVEMENT >75% Grass cover, Good, HSG C							
	48,600 32,000 16,600	82	Weighted A Pervious Ai Impervious	verage ea						
T (mir	c Length	Slope (ft/ft		Capacity (cfs)	Description					
6.	0				Direct Entry,					

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Summary for Subcatchment D1: IMP / SITE

Runoff

44.07 cfs @ 12.09 hrs, Volume=

146,393 cf, Depth> 7.10"

******	Area	(ac)	CN	Des	cription						
	0.	836	74	>759	% Grass co	over, Good	. HSG C				
	0.	742	61			over, Good					
*	0.	745	98	ROC	F						
*	1.	018	98	PAV	EMENT						
*	0.	574	98	FUT	URE ROO	F					
*	1.	148	98	FUT	JTURE PAVMENT						
*	0.	0.614 68 FUTURE LAWN HSG B/C									
	5.677 86 Weighted Average					age					
	2.192 Pervious Area					J					
	3.485 Impervious Area										
	Tc	Lengt	h S	Slope	Velocity	Capacity	Description				
	(min)	(feet	t)	(ft/ft)	(ft/sec)	(cfs)	•				
	6.0						Direct Entry,				

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Summary for Subcatchment D2: UNDETAINED TO AP1

Runoff = 10.41 cfs @ 12.09 hrs, Volume=

33,004 cf, Depth> 5.52"

	Area	(ac)	CN	Des	cription				
	0.	181	77	Woo	ds, Good,	HSG D		······································	
	0.995 70 Woods, Good, HSG C					HSG C			
	0.	163	80	>759	% Grass co	over, Good	, HSG D		
_	0.	308	74	>759	% Grass co	over, Good	HSG C		
		647 647	73	•	ted Aver ious Area	age			
	Tc (min)	Leng (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	6.0						Direct Entry,		

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Summary for Subcatchment D3: UNDETAINED TO AP2

Runoff

14.94 cfs @ 12.09 hrs, Volume=

47,134 cf, Depth> 4.91"

	\rea (sf)	CN	Description							
	5,900	77	Woods, God	od, HSG D						
	64,400	70	Woods, God	Voods, Good, HSG C						
	21,200	55	Woods, Good, HSG B							
	10,500	80	>75% Grass cover, Good, HSG D							
	8,970	74	>75% Grass cover, Good, HSG C							
	4,200	61	>75% Grass cover, Good, HSG B							
•	115,170									
115,170 68 Weighted Average 115,170 Pervious Area				ea						
Tc	Length	Slop	e Velocity	Capacity	Description					
<u>(min)</u>	(feet)	(ft/fi	t) (ft/sec)	(cfs)	-					
6.0					Direct Entry,					
					•					

Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Subcatchment D4: BASIN/LAWN

Runoff

4.43 cfs @ 12.09 hrs, Volume=

14,201 cf, Depth> 6.13"

	Area (sf)	CN	Description								
	20,100	80	>75% Gras	75% Grass cover, Good, HSG D							
	7,700		>75% Grass cover, Good, HSG C								
	27,800	78	Weighted A	eighted Average							
	27,800 Pervious Area										
To (min)		Slope (ft/ft	,	Capacity (cfs)	Description						
6.0	······································	71012	<u>/ (10 000)</u>		Direct Entry,						

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Summary for Subcatchment EX1: AP1 EXIST PEAK

Runoff = 28.46 cfs @ 12.16 hrs, Volume=

104,892 cf, Depth> 4.91"

	Area	(ac) (CN Des	cription				
		210		ods, Good,				
	4.	160	70 Woo	ods, Good,	HSG C			
	0.	520	77 Woo	ds, Good,	HSG D			
5.890 68 Weighted Average								
	5.	890		∕ious Area	J			
	Tc (min)	Length (feet)		Velocity (ft/sec)	Capacity (cfs)	Description		
	9.3	50	0.0400	0.09		Sheet Flow, a-b		
	1.8	530	0.0900	4.83		Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, b-c Unpaved Kv= 16.1 fps		
	11.1	580	Total					

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Summary for Subcatchment EX2: AP2 EXIST PEAK

Runoff = 24.07 cfs @ 12.11 hrs, Volume=

79,946 cf, Depth> 4.67"

	Area	(ac) (ON Des	cription				
				ods, Good,				
	2.	420	70 Wo	ods, Good,	HSG C			
0.650 77 Woods, Good, HSG D								
	4.	720	66 We	ghted Avei	age			
4.720 Pervious Area								
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description		
	6.5	50	0.1000	0.13		Sheet Flow, a-b		
	1.2	340	0.0800	4.55		Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, b-c Unpaved Kv= 16.1 fps		
	7.7	390	Total					

Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Reach S1: SWALE 1

Inflow Area = 21,700 sf, 58.53% Impervious, Inflow Depth > 7.35" for Grafton-100yr event

Inflow = 3.95 cfs @ 12.09 hrs, Volume= 13,285 cf

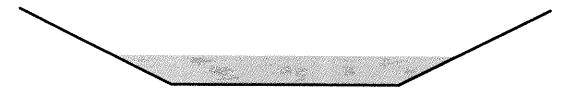
Outflow = 3.71 cfs @ 12.13 hrs, Volume= 13,266 cf, Atten= 6%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.66 fps, Min. Travel Time= 1.3 min Avg. Velocity = 0.72 fps, Avg. Travel Time= 4.9 min

Peak Storage= 309 cf @ 12.10 hrs, Average Depth at Peak Storage= 0.39' Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.19 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 210.0' Slope= 0.0095 '/' Inlet Invert= 408.00', Outlet Invert= 406.00'



Stage-Area-Storage for Reach S1: SWALE 1

(feet) (sq-ft) (cubic-feet) (feet) (sq-ft) (cubic-feet) 408.00 0.0 6 408.53 2.2 452 408.01 0.0 6 408.54 2.2 463 408.02 0.1 13 408.55 2.3 474 408.04 0.1 26 408.57 2.4 496 408.05 0.2 33 408.58 2.4 507 408.06 0.2 33 408.59 2.5 518 408.07 0.2 46 408.60 2.5 529 408.08 0.3 53 408.61 2.6 551 408.10 0.3 67 408.62 2.6 552 408.11 0.4 74 408.64 2.7 554 408.12 0.4 82 408.65 2.8 587 408.13 0.4 482 408.65 2.9 599 408.14 0.5 96	Elevation	End-Area	Storage	Elevation	End-Area	Storage
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Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Reach S2: SWALE 2

Inflow Area = 115,000 sf, 80.00% Impervious, Inflow Depth > 7.95" for Grafton-100yr event

Inflow = 21.82 cfs @ 12.09 hrs, Volume= 76,206 cf

Outflow = 20.33 cfs @ 12.17 hrs, Volume= 76,002 cf, Atten= 7%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Max. Velocity= 4.07 fps, Min. Travel Time= 2.8 min Avg. Velocity = 1.19 fps, Avg. Travel Time= 9.7 min

Peak Storage= 3,452 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.87' Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.42 cfs

4.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 8.00' Length= 690.0' Slope= 0.0087 '/' Inlet Invert= 404.00', Outlet Invert= 398.00'



Stage-Area-Storage for Reach S2: SWALE 2

Elevation	End-Area	Storage	Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
404.00	0.0	0	404.53	2.7	1,850
404.01	0.0	28	404.54	2.7	1,893
404.02	0.1	56	404.55	2.8	1,935
404.03	0.1	84	404.56	2.9	1,978
404.04	0.2	113	404.57	2.9	2,022
404.05	0.2	141	404.58	3.0	2,065
404.06	0.2	171	404.59	3.1	2,109
404.07	0.3	200	404.60	3.1	2,153
404.08	0.3	230	404.61	3.2	2,197
404.09	0.4	260	404.62	3.2	2,242
404.10	0.4	290	404.63	3.3	2,287
404.11	0.5	320	404.64	3.4	2,332
404.12	0.5	351	404.65	3.4	2,377
404.13	0.6	382	404.66	3.5	2,423
404.14	0.6	413	404.67	3.6	2,469
404.15	0.6	445	404.68	3.6	2,515
404.16	0.7	477	404.69	3.7	2,561
404.17	0.7	509	404.70	3.8	2,608
404.18	0.8	542	404.71	3.8	2,655
404.19	0.8	574	404.72	3.9	2,703
404.20	0.9	607	404.73	4.0	2,750
404.21 404.22	0.9	640	404.74	4.1	2,798
404.22	1.0	674	404.75	4.1	2,846
404.23	1.0 1.1	708	404.76	4.2	2,895
404.24	1.1	742	404.77	4.3	2,943
404.26	1.2	776 811	404.78	4.3	2,992
404.27	1.2	846	404.79 404.80	4.4	3,042
404.28	1.3	881	404.80	4.5 4.6	3,091
404.29	1.3	916	404.81	4.6	3,141 3,191
404.30	1.4	952	404.83	4.0	3,191
404.31	1.4	988	404.84	4.8	3,292
404.32	1.5	1,025	404.85	4.8	3,343
404.33	1.5	1,061	404.86	4.9	3,394
404.34	1.6	1,098	404.87	5.0	3,446
404.35	1.6	1,135	404.88	5.1	3,497
404.36	1.7	1,172	404,89	5.1	3,549
404.37	1.8	1,210	404.90	5.2	3,602
404.38	1.8	1,248	404.91	5.3	3,654
404.39	1.9	1,286	404.92	5.4	3,707
404.40	1.9	1,325	404.93	5.4	3,760
404.41	2.0	1,364	404.94	5.5	3,814
404.42	2.0	1,403	404.95	5.6	3,867
404.43	2.1	1,442	404.96	5.7	3,921
404,44	2.1	1,482	404.97	5.8	3,976
404.45	2.2	1,521	404.98	5.8	4,030
404.46	2.3	1,562	404.99	5.9	4,085
404.47	2.3	1,602	405.00	6.0	4,140
404.48	2.4	1,643			
404.49	2.4	1,684			
404.50	2.5	1,725			
404.51	2.6	1,767			
404.52	2.6	1,808			

Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Reach S3: SWALE 3

Inflow Area =

48,600 sf, 34.16% Impervious, Inflow Depth > 6.62" for Grafton-100yr event

Inflow

26,801 cf

Outflow

8.23 cfs @ 12.09 hrs, Volume= 7.69 cfs @ 12.16 hrs, Volume=

26,734 cf, Atten= 7%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.23 fps, Min. Travel Time= 2.3 min Avg. Velocity = 0.94 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,068 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.58' Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.68 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 440.0' Slope= 0.0091 '/' inlet invert= 408.00', Outlet invert= 404.00'



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Stage-Area-Storage for Reach S3: SWALE 3

Elevation	End Area	Characa) min	™	0 4
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
408.00	0.0	0	408.53	2.2	947
408.01	0.0	13	408.54	2.2	969
408.02	0.1	27	408.55	2.3	992
408.03	0.1	40	408,56	2.3	1,015
408.04	0.1	54	408.57	2.4	1,038
408.05	0.2	68	408.58	2.4	1,062
408.06	0.2	82	408.59	2.5	1,085
408.07	0.2	97	408.60	2.5	1,109
408.08	0.3	111	408.61	2.6	1,133
408.09	0.3	126	408.62	2.6	1,157
408.10	0.3	141	408.63	2.7	1,181
408,11	0.4 0.4	156	408.64	2.7	1,205
408.12 408.13	0.4	171 186	408.65 408.66	2.8 2.9	1,230
408.14	0.4	202	408.67	2.9	1,255 1,279
408.15	0.5	218	408.68	3.0	1,305
408.16	0.5	234	408.69	3.0	1,330
408.17	0.6	250	408.70	3.1	1,355
408.18	0.6	266	408.71	3.1	1,381
408.19	0.6	283	408.72	3.2	1,407
408.20	0.7	299	408.73	3.3	1,433
408.21	0.7	316	408,74	3.3	1,459
408.22	8.0	333	408.75	3.4	1,485
408.23	0.8	350	408.76	3.4	1,511
408.24	0.8	367	408.77	3.5	1,538
408.25	0.9	385	408.78	3.6	1,565
408.26	0.9	403	408.79	3.6	1,592
408.27	1.0	421	408.80	3.7	1,619
408.28 408.29	1.0 1.0	439 457	408.81	3.7	1,647
408.30	1.1	475	408.82 408.83	3.8 3.9	1,674 1,702
408.31	1,1	494	408.84	3.9	1,730
408,32	1.2	513	408.85	4.0	1,758
408.33	1.2	531	408.86	4.1	1,786
408.34	1.3	551	408.87	4.1	1,814
408.35	1.3	570	408.88	4.2	1,843
408.36	1.3	589	408.89	4.3	1,872
408.37	1.4	609	408.90	4.3	1,901
408.38	1.4	629	408.91	4.4	1,930
408.39	1.5	649	408.92	4.5	1,959
408.40	1.5	669	408.93	4.5	1,989
408.41	1.6	689	408.94	4.6	2,018
408.42	1.6	710	408.95	4.7	2,048
408,43 408,44	1.7 1.7	730 751	408.96	4.7	2,078
408.45	1.7	751 772	408,97 408,98	4.8 4.9	2,108
408.46	1.8	793	408.99	4.9	2,139 2,169
408.47	1.9	815	409.00	5.0	2,709 2,200
408.48	1.9	836		5.0	£,£00
408.49	2.0	858			
408.50	2.0	880			•
408.51	2.1	902			
408.52	2.1	924			

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Summary for Pond B1: BASIN 1

Inflow Area = 275,090 sf, 55.18% Impervious, Inflow Depth > 7.01" for Grafton-100yr event 48.49 cfs @ 12.09 hrs, Volume= 160,594 cf

Outflow = 26.21 cfs @ 12.22 hrs, Volume= 146,110 cf, Atten= 46%, Lag= 8.2 min 0.49 cfs @ 12.22 hrs, Volume= 18,545 cf

Primary = 25.72 cfs @ 12.22 hrs, Volume= 127,565 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 397.55' @ 12.22 hrs Surf.Area= 21,109 sf Storage= 59,416 cf

Plug-Flow detention time= 142.6 min calculated for 146,110 cf (91% of inflow) Center-of-Mass det. time= 97.7 min (883.6 - 785.9)

Volume	Inve	<u>rt Avail.S</u>	Storage	Storage Description					
#1	392.0	0' 69	,389 cf	Custom Stage Da	ıta (Irregular)Listed	below (Recalc)			
Elevation		Surf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area			
(fee	et)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)			
392.0		2,725	260.0	0	0	2,725			
394.0		4,390	310.0	7,049	7,049	5,063			
394.1		10,300	730.0	714	7,763	39,823			
396.0		14,960	840.0	23,860	31,623	53,647			
398.0	00	23,100	860.0	37,766	69,389	56,842			
Device	Routing	Inve	rt Outle	et Devices					
#1	Discarded	392.0	0' 1.00	0 in/hr Exfiltration	over Horizontal a	rea			
#2	Primary	396.8	0' 8.0 '	long x 12.0' bread	th Broad-Crested	Rectangular Weir			
				d (feet) 0.20 0.40 f. (English) 2.57 2.6					
#3	Primary	397.0	0' 5.0'	5.0' long x 12.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60					
.44.4	Drivens	204.0	Coef	(English) 2.57 2.6	62 2.70 2.67 2.66	3 2.67 2.66 2.64			
#4	Primary	394.0	or 6.0" Outle	x 20.0' long Culve et Invert= 393.50'	ert CMP, square ed S= 0.0250 '/' Cc= (dge headwall, Ke= 0.500 0.900 n= 0.013			
#5	Primary	395.5	o' 12.0 '		vert CPP, square e	dge headwall, Ke= 0.500			

Discarded OutFlow Max=0.49 cfs @ 12.22 hrs HW=397.54' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=25.28 cfs @ 12.22 hrs HW=397.54' (Free Discharge)

-2=Broad-Crested Rectangular Weir (Weir Controls 13.61 cfs @ 2.30 fps)

—3=Broad-Crested Rectangular Weir (Weir Controls 5.29 cfs @ 1.96 fps)

-4=Culvert (Barrel Controls 1.69 cfs @ 8.60 fps)
-5=Culvert (Inlet Controls 4.69 cfs @ 5.97 fps)

Stage-Area-Storage for Pond B1: BASIN 1

Elevation	Surface	Horizontal	Storage
(feet)	(sq-ft)	(sq-ft)	(cubic-feet)
392.00	2,725	2,725	0
392.20	2,874	2,874	560
392.40	3,026	3,026	1,150
392,60	3,183	3,183	1,771
392.80	3,344	3,344	2,423
393.00	3,508	3,508	3,108
393.20	3,677	3,677	3,827
393.40	3,849	3,849	4,579
393.60	4,025	4,025	5,367
393.80	4,206	4,206	6,190
394.00	4,390	4,390	7,049
394.20	10,524	10,524	8,804
394.40	10,978	10,978	10,954
394.60	11,442	11,442	13,196
394.80	11,916	11,916	15,532
395.00	12,399	12,399	17,963
395.20	12,892	12,892	20,492
395,40	13,395	13,395	23,121
395.60	13,907	13,907	25,851
395.80	14,429	14,429	28,684
396.00	14,960	14,960	31,623
396,20	15,695	15,695	34,688
396.40	16,447	16,447	37,902
396.60	17,217	17,217	41,268
396,80	18,005	18,005	44,790
397.00	18,810	18,810	48,471
397.20	19,633	19,633	52,315
397.40	20,473	20,473	56,325
397.60	21,331	21,331	60,505
397.80	22,207	22,207	64,859
398.00	23,100	23,100	69,389

Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Link AP1: ANALYSIS POINT 1

Inflow Area = 71,743 sf, 0.00% Impervious, Inflow Depth > 5.52" for Grafton-100yr event

10.41 cfs @ 12.09 hrs, Volume= 10.41 cfs @ 12.09 hrs, Volume= Inflow = 33,004 cf

Primary = 33,004 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-100yr Rainfall=8.80"

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Summary for Link AP2: ANALYSIS POINT 2

115,170 sf, 0.00% Impervious, Inflow Depth > 4.91" for Grafton-100yr event 14.94 cfs @ 12.09 hrs, Volume= 47,134 cf 47,134 cf, Atten= 0%, Lag= 0.0 min Inflow Area =

Inflow

Primary = 47,134 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-10yr Rainfall=4.87"

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Summary for Subcatchment A1: TO SWALE 1

Runoff

1.98 cfs @ 12.09 hrs, Volume=

6,407 cf, Depth> 3.54"

	P	rea (sf)	CN	Description	1					
*	···	12,700 9,000	98 74	ROOF & PAVEMENT >75% Grass cover, Good, HSG C						
		21,700 9,000 12,700		Weighted A Pervious A	Weighted Average Pervious Area Impervious Area					
(1	Tc min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description				
	6.0					Direct Entry,				

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Summary for Subcatchment A2: TO SWALE 2

Runoff = 11.59 cfs @ 12.09 hrs, Volume=

38,981 cf, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Grafton-10yr Rainfall=4.87"

	Ar	ea (sf)	CN	Description			
3	٠ (92,000	98	ROOF & PA	AVEMENT		***************************************
_	2	23,000	74	>75% Gras	s cover, Go	od, HSG C	
	11	15,000	93	Weighted A	verage		
	2	23,000 Pervious Area					
	g	92,000		Impervious	Area		
-	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description	
	~ ~			·			

6.0

Direct Entry,

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Summary for Subcatchment A3: TO SWALE 3

Runoff =

3.79 cfs @ 12.09 hrs, Volume=

11,990 cf, Depth> 2.96"

	ļ	Area (sf)	CN	Description								
*		16,600	98	ROOF & PA	ROOF & PAVEMENT							
_		32,000	74	>75% Gras	75% Grass cover, Good, HSG C							
		48,600 32,000 16,600	82	Pervious A	/eighted Average ervious Area npervious Area							
_	Tc (min)	Length (feet)	Slope (ft/ft	•	Capacity (cfs)	Description						
	6.0					Direct Entry,						

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Summary for Subcatchment D1: IMP / SITE

Runoff = 21.51 cfs @ 12.09 hrs, Volume=

68,896 cf, Depth> 3.34"

*****	Area	(ac)	CN	Desc	cription					
	0.	836	74	>75% Grass cover, Good, HSG C						
	0.	742	61	>759	% Grass co	over, Good	, HSG B			
*	0.	745	98	ROC	F					
*	1.	018	98	PAV	EMENT					
*	0.	574	98	FUT	URE ROO	F				
*	1.	148	98	FUT	URE PAVI	VIENT				
*	0.	614	68	FUT	URE LAW	N HSG B/C	;			
	5.	677	86	Weig	hted Aver	age				
	2.	192		Perv	ious Area	J				
	3.	485		Impe	ervious Are	a				
				•						
	Тс	Lengi	ih :	Slope	Velocity	Capacity	Description			
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	-			
	6.0						Direct Entry,			

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Summary for Subcatchment D2: UNDETAINED TO AP1

Runoff 4.10 cfs @ 12.10 hrs, Volume=

13,014 cf, Depth> 2.18"

	Area (ac)	CN	Desc	ription						
	0.1	181	77	Woo	ds, Good,	HSG D			***************************************		
	0.9	995	70	Woo	Woods, Good, HSG C						
	0.1	163	80	>75%	% Grass co	over, Good,	, HSG D				
•••	0.3	308	74	>75%	6 Grass co	over, Good,	HSG C				
		347	73	_	hted Aver	age					
	1.0	547		Perv	ious Area						
	Тс	Length	1	Slope	Velocity	Capacity	Description				
***	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	,				
	6.0						Direct Entry				

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Summary for Subcatchment D3: UNDETAINED TO AP2

Runoff

5.28 cfs @ 12.10 hrs, Volume=

17,138 cf, Depth> 1,79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Grafton-10yr Rainfall=4.87"

	Ar	ea (sf)	CN	Description								
		5,900	77	Woods, God	/oods, Good, HSG D							
	(64,400	70	Woods, God	Voods, Good, HSG C							
	:	21,200	55	Woods, God	Voods, Good, HSG B							
	•	10,500	80	>75% Grass	75% Grass cover, Good, HSG D							
		8,970	74	>75% Grass	>75% Grass cover, Good, HSG C							
		4,200	61	>75% Grass	s cover, Go	od, HSG B						
	1.	15,170	68	Weighted A	verage							
	1.	15,170		Pervious Ar	ea							
	_											
		Length	Slop	•	Capacity	Description						
_	<u>(min)</u>	(feet)	(ft/fi	t) (ft/sec)	(cfs)							
	6.0					Direct Entry						

Direct Entry,

Type III 24-hr Grafton-10yr Rainfall=4.87"

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Summary for Subcatchment D4: BASIN/LAWN

Runoff =

1.91 cfs @ 12.09 hrs, Volume=

6,022 cf, Depth> 2.60"

Area (sf) CN Description											
		20,100	80	>75% Gras	75% Grass cover, Good, HSG D						
7,700 74 >75% Grass cover, Good, HSG C											
		27,800 27,800	78	Weighted A Pervious Ar	_						
	Tc (min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description					
	6.0					Direct Entry.		·			

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Summary for Subcatchment EX1: AP1 EXIST PEAK

Runoff =

9.98 cfs @ 12.17 hrs, Volume=

38,128 cf, Depth> 1.78"

_	Area	(ac) C	N Des	cription		
				ds, Good,		
			70 Woo	ds, Good,	HSG C	
	0.	.520	77 Woo	ds, Good,	HSG D	
	5.	.890 (68 Wei	ghted Aver	age	
	5.	.890	Perv	ious Area	-	
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	50	0.0400	0.09		Sheet Flow, a-b
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.8	530	0.0900	4.83		Shallow Concentrated Flow, b-c
_						Unpaved Kv= 16.1 fps
	11.1	580	Total			

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Summary for Subcatchment EX2: AP2 EXIST PEAK

Runoff = 8.04 cfs @ 12.12 hrs, Volume=

28,050 cf, Depth> 1.64"

	Area	(ac) C	N Des	cription				
	1.	.650	55 Woo	ds, Good,	HSG B			
	2.	.420	70 Woo	ds, Good,	HSG C			
	0.	650	77 Woo	ds, Good,	HSG D			
	4.720 66 Weighted Average							
4.720 Pervious Area								
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
	6.5	50	0.1000	0.13		Sheet Flow, a-b		
	1.2	340	0.0800	4.55		Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, b-c Unpaved Kv= 16.1 fps		
	77	390	Total					

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Summary for Reach S1: SWALE 1

Inflow Area = 21,700 sf, 58.53% Impervious, Inflow Depth > 3.54" for Grafton-10yr event

Inflow = 1.98 cfs @ 12.09 hrs, Volume= 6,407 cf

Outflow = 1.86 cfs @ 12.14 hrs, Volume= 6,394 cf, Atten= 6%, Lag= 3.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.11 fps, Min. Travel Time= 1.7 min Avg. Velocity = 0.57 fps, Avg. Travel Time= 6.1 min

Peak Storage= 193 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.26' Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.19 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 210.0' Slope= 0.0095 '/' Inlet Invert= 408.00', Outlet Invert= 406.00'



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Stage-Area-Storage for Reach S1: SWALE 1

Elevation	End-Area	Storage	l Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
408.00	0.0	0	408.53	2.2	452
408.01	0.0	6	408.54	2.2	463
408.02	0.1	13	408.55	2.3	474
408.03	0.1	19	408.56	2.3	485
408.04	0.1	26	408.57	2.4	496
408.05	0.2	33	408,58	2.4	507
408.06		39	408.59	2.5	518
408.07	0.2	46	408.60	2.5	529
408.08	0.3	53	408.61	2.6	541
408.09	0.3	60	408.62	2.6	552
408.10	0.3	67	408.63	2.7	564
408.11	0.4	74	408.64	2.7	575
408.12	0.4	82	408.65	2.8	587
408.13	0.4	89	408.66	2.9	599
408.14	0.5	96	408.67	2.9	611
408.15	0.5	104	408.68	3.0	623
408,16	0.5	112	408,69	3.0	635
408.17	0.6	119	408.70	3.1	647
408.18 408.19	0.6 0.6	127 135	408.71 408.72	3.1	659 674
408.19	0.7	143	408.72	3.2 3.3	671
408.20	0.7	151	408.73	3,3 3,3	684 696
408.21	0.7	159	408.75	3.4	709
408.23	0.8	167	408.76	3.4	703 721
408.24	0.8	175	408.77	3.5	734
408.25		184	408.78	3.6	747
408.26	0.9	192	408.79	3.6	760
408.27	1.0	201	408.80	3.7	773
408.28		209	408.81	3.7	786
408.29		218	408.82	3.8	799
408,30		227	408.83	3.9	812
408.31	1.1	236	408.84	3.9	, 826
408.32	1.2	245	408.85	4.0	839
408.33	1.2	254	408.86	4.1	852
408.34	1.3	263	408.87	4.1	866
408.35		272	408.88	4.2	880
408.36		281	408.89	4.3	893
408.37		291	408.90	4.3	907
408.38		300	408.91	4.4	921
408.39	1.5	310	408.92	4.5	935
408.40		319	408.93	4.5	949
408.41	1.6	329	408.94	4.6	963
408.42		339	408.95	4.7	978
408.43	1.7	349	408.96	4.7	992
408.44	1.7	359	408.97	4.8	1,006
408,45 408,46	1.8 1.8	369 379	408.98 408.99	4.9 4.9	1,021 1,035
408.47	1.0	379 389	408.99	4.9 5.0	1,035 1,050
408.48	1.9	399	1 703.00	5.0	1,000
408.49		410			
408.50	2.0	420			
408.51	2.1	431			
408.52		441			
· · · · ·					

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Summary for Reach S2: SWALE 2

Inflow Area = 115,000 sf, 80.00% Impervious, Inflow Depth > 4.07" for Grafton-10yr event

Inflow = 11.59 cfs @ 12.09 hrs, Volume= 38,981 cf

Outflow = 10.43 cfs @ 12.18 hrs, Volume= 38,840 cf, Atten= 10%, Lag= 5.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.33 fps, Min. Travel Time= 3.5 min Avg. Velocity = 0.94 fps, Avg. Travel Time= 12.2 min

Peak Storage= 2,186 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.61' Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.42 cfs

4.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 8.00' Length= 690.0' Slope= 0.0087 '/' Inlet Invert= 404.00', Outlet Invert= 398.00'

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Stage-Area-Storage for Reach S2: SWALE 2

	End-Area	Storage	Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
404.00	0.0	0	404.53	2.7	1,850
404.01	0.0	28	404.54	2.7	1,893
404.02	0.1	56	404,55	2.8	1,935
404.03	0.1	84	404.56	2.9	1,978
404.04	0.2	113	404.57	2.9	2,022
404.05	0.2	141	404.58	3.0	2,065
404.06	0.2	171	404.59	3.1	2,109
404.07	0.3	200	404.60	3.1	2,153
404.08	0.3	230	404.61	3.2	2,197
404.09	0.4	260	404.62	3.2	2,242
404.10	0.4	290	404.63	3.3	2,287
404.11	0.5	320	404.64	3.4	2,332
404.12	0.5	351	404.65	3.4	2,377
404.13	0.6	382	404.66	3.5	2,423
404.14	0.6	413	404.67	3.6	2,469
404.15	0.6	445	404.68	3.6	2,515
404.16	0.7	477	404.69	3.7	2,561
404.17	0.7	509	404.70	3.8	2,608
404.18	8.0	542 574	404.71	3.8	2,655
404.19	0.8	574	404.72	3.9	2,703
404,20	0.9	607	404.73	4.0	2,750
404.21	0.9	640 674	404.74	4.1	2,798
404.22	1.0		404.75	4.1	2,846
404.23 404.24	1.0 1.1	708 742	404.76	4.2 4.3	2,895
404.24	1.1	742 776	404.77 404.78	4.3 4.3	2,943 2,992
404.25	1.2	811	404.79	4.3 4.4	2,992 3,042
404.27	1.2	846	404.73	4.5	3,042 3,091
404.28	1.3	881	404.81	4.6	3,141
404.29	1.3	916	404.82	4.6	3,191
404.30	1.4	952	404.83	4.7	3,241
404.31	1.4	988	404.84	4.8	3,292
404.32	1.5	1,025	404.85	4.8	3,343
404.33	1.5	1,061	404.86	4.9	3,394
404.34	1.6	1,098	404.87	5.0	3,446
404.35	1.6	1,135	404.88	5.1	3,497
404.36	1.7	1,172	404.89	5.1	3,549
404.37	1.8	1,210	404.90	5.2	3,602
404.38	1.8	1,248	404.91	5.3	3,654
404.39	1.9	1,286	404.92	5.4	3,707
404.40	1.9	1,325	404,93	5.4	3,760
404.41	2.0	1,364	404.94	5.5	3,814
404.42	2.0	1,403	404.95	5.6	3,867
404.43	2.1	1,442	404.96	5.7	3,921
404,44	2.1	1,482	404.97	5.8	3,976
404.45	2.2	1,521	404.98	5.8	4,030
404.46	2.3	1,562	404.99	5.9	4,085
404.47	2.3	1,602	405.00	6.0	4,140
404.48	2.4	1,643			
404.49	2.4	1,684			
404.50	2.5	1,725			
404.51	2.6	1,767			
404.52	2.6	1,808			
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Summary for Reach S3: SWALE 3

48,600 sf, 34.16% Impervious, Inflow Depth > 2.96" for Grafton-10yr event Inflow Area =

3.79 cfs @ 12.09 hrs, Volume= 3.53 cfs @ 12.17 hrs, Volume= Inflow 11,990 cf

Outflow 11,946 cf, Atten= 7%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.51 fps, Min. Travel Time= 2.9 min Avg. Velocity = 0.75 fps, Avg. Travel Time= 9.8 min

Peak Storage= 614 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.37' Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.68 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 440.0' Slope= 0.0091 '/'

Inlet Invert= 408.00', Outlet Invert= 404.00'

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Stage-Area-Storage for Reach S3: SWALE 3

Flevation	End-Area	Storogo	J = 1 = 1 = 1 = 1		.
(feet)	(sq-ft)	Storage (cubic-feet)	(feet)	End-Area (sq-ft)	Storage (cubic-feet)
408.00	0.0	0	408.53	2.2	
408.01	0.0	13	408.54	2.2	947 969
408.02	0.1	27	408.55	2.3	992
408.03	0.1	40	408.56	2.3	1,015
408.04	0.1	54	408.57	2.4	1,038
408.05	0.2	68	408.58	2.4	1,062
408.06	0.2	82	408.59	2.5	1,085
408.07	0.2	97	408.60	2.5	1,109
408.08	0.3	111	408.61	2.6	1,133
408.09	0.3	126	408.62	2.6	1,157
408.10 408.11	0.3	141	408.63	2.7	1,181
408.11	0.4 0.4	156	408.64	2.7	1,205
408.12	0.4	171 186	408.65	2.8	1,230
408.14	0.5	202	408.66 408.67	2.9	1,255
408.15	0.5	218	408.68	2.9 3.0	1,279
408.16	0.5	234	408.69	3.0	1,305
408,17	0.6	250 250	408.70	3.1	1,330 1,355
408.18	0.6	266	408.71	3.1	1,381
408,19	0.6	283	408.72	3.2	1,407
408.20	0.7	299	408.73	3.3	1,433
408.21	0.7	316	408.74	3,3	1,459
408.22	0.8	333	408.75	3.4	1,485
408.23	0.8	350	408.76	3.4	1,511
408.24	0.8	367	408.77	3.5	1,538
408.25 408.26	0.9	385	408.78	3.6	1,565
408.27	0.9 1.0	403	408.79	3.6	1,592
408.28	1.0	421 439	408.80	3.7	1,619
408.29	1.0	457	408.81 408.82	3.7 3.8	1,647
408.30	1.1	475	408.83	3.9	1,674 1,702
408.31	1.1	494	408.84	3.9	1,730
408.32	1.2	513	408.85	4.0	1,758
408.33	1.2	531	408,86	4.1	1,786
408.34	1.3	551	408.87	4.1	1,814
408.35	1.3	570	408.88	4.2	1,843
408.36	1.3	589	408.89	4.3	1,872
408.37 408.38	1.4	609	408.90	4.3	1,901
408.39	1.4 1.5	629	408.91	4.4	1,930
408.40	1.5	649 669	408.92	4.5	1,959
408.41	1.6	689	408.93 408.94	4.5	1,989
408.42	1.6	710	408.95	4.6 4.7	2,018
408.43	1.7	730	408,96	4.7	2,048 2,078
408.44	1.7	751	408.97	4.8	2,078 2,108
408.45	1.8	772	408,98	4.9	2,139
408.46	1.8	793	408.99	4.9	2,169
408.47	1.9	815	409.00	5.0	2,200
408.48	1.9	836			,
408.49	2.0	858			
408.50	2.0	880			
408.51 408.52	2.1 2.1	902			
**************************************	۷. ۱	924			

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Summary for Pond B1: BASIN 1

275,090 sf, 55.18% Impervious, Inflow Depth > 3.27" for Grafton-10yr event Inflow Area = 23.42 cfs @ 12.09 hrs, Volume= inflow = 74,917 cf 3.90 cfs @ 12.57 hrs, Volume= Outflow 65,219 cf, Atten= 83%, Lag= 29.0 min Discarded = 0.37 cfs @ 12.57 hrs, Volume= 14,746 cf Primary = 3.53 cfs @ 12.57 hrs, Volume= 50,474 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 396.33' @ 12.57 hrs Surf.Area= 16.185 sf Storage= 36.774 cf

Plug-Flow detention time= 210.2 min calculated for 65,084 cf (87% of inflow) Center-of-Mass det. time= 152.7 min (959.5 - 806.8)

Volume	Invert	Avail.S	torage	Storage Descripti	on			
#1	392.00	69	389 cf	Custom Stage Data (Irregular)Listed below (Recalc)				
Elevatio (fee		urf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
392.0	0	2,725	260.0	0	0	2,725		
394.0 394.1		4,390 10.300	310.0 730.0	7,049 714	7,049 7,763	5,063 39,823		
396.0		14,960	840.0	23,860	31,623	53,647		
398.0	U	23,100	860.0	37,766	69,389	56,842		
Device	Routing	Inver	t Outle	et Devices				
#1	Discarded	392.00			n over Horizontal			
#2	Primary	396.80				d Rectangular Weir		
#3	Primary	397.00	Coef	Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.50 long x 12.0 breadth Broad-Crested Rectangular W				
	Ť		Head	d (feet) 0.20 0.40	0.60 0.80 1.00			
#4	Primary	394.00	6.0"	x 20.0' long Culv		edge headwall, Ke= 0.5	500	
#5	Primary	395.50	12.0	2.0" x 20.0' long Culvert CPP, square edge headwall, Ke= 0.500 Dutlet Invert= 395.00' S= 0.0250 '/' Cc= 0.900 n= 0.013				

Discarded OutFlow Max=0.37 cfs @ 12.57 hrs HW=396.33' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.37 cfs)

Primary OutFlow Max=3.52 cfs @ 12.57 hrs HW=396.33' (Free Discharge)

2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

-4=Culvert (inlet Controls 1.36 cfs @ 6.94 fps)

-5=Culvert (inlet Controls 2.16 cfs @ 3.10 fps)

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Stage-Area-Storage for Pond B1: BASIN 1

Elevation	Surface	Horizontal	Chara
(feet)	(sq-ft)	(sq-ft)	Storage (cubic-feet)
392.00	2,725	2,725	
392.20	2,874	2,723	0 560
392.40	3,026	3,026	560
392.60	3.183	3,183	1,150
392.80	3,344	3,344	1,771
393.00	3,508	3,508	2,423 3,108
393.20	3,677	3,677	3,108
393.40	3,849	3,849	4,579
393.60	4,025	4,025	5,367
393.80	4,206	4,206	6,190
394.00	4,390	4,390	7,049
394.20	10,524	10,524	8,804
394.40	10,978	10,978	10,954
394.60	11,442	11.442	13,196
394.80	11,916	11,916	15,532
395.00	12,399	12,399	17,963
395.20	12,892	12,892	20,492
395.40	13,395	13,395	23,121
395.60	13,907	13,907	25,851
395.80	14,429	14,429	28,684
396.00	14,960	14,960	31,623
396.20	15,695	15,695	34,688
396.40	16,447	16,447	37,902
396.60	17,217	17,217	41,268
396.80	18,005	18,005	44,790
397.00	18,810	18,810	48,471
397.20	19,633	19,633	52,315
397.40	20,473	20,473	56,325
397.60	21,331	21,331	60,505
397.80	22,207	22,207	64,859
398.00	23,100	23,100	69,389

Type III 24-hr Grafton-10yr Rainfall=4.87"

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Summary for Link AP1: ANALYSIS POINT 1

71,743 sf, 0.00% Impervious, Inflow Depth > 2.18" for Grafton-10yr event 4.10 cfs @ 12.10 hrs, Volume= 13,014 cf 4.10 cfs @ 12.10 hrs, Volume= 13,014 cf, Atten= 0%, Lag= 0.0 min Inflow Area =

inflow

Primary =

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-10yr Rainfall=4.87"

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Summary for Link AP2: ANALYSIS POINT 2

115,170 sf, 0.00% Impervious, Inflow Depth > 1.79" for Grafton-10yr event 5.28 cfs @ 12.10 hrs, Volume= 17,138 cf Inflow Area =

Inflow = 17,138 cf

Primary = 5.28 cfs @ 12.10 hrs, Volume= 17,138 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Summary for Subcatchment A1: TO SWALE 1

Runoff

2.63 cfs @ 12.09 hrs, Volume=

8,638 cf, Depth> 4.78"

***************************************	Area (sf)	CN	Description				
*	12,700 9,000	98 74	ROOF & PAVEMENT >75% Grass cover, Good, HSG C				
	21,700 9,000 12,700	88	Weighted A Pervious Ar Impervious	verage ea			
T <u>(min</u>	c Length) (feet)	Slope (ft/ft	,	Capacity (cfs)	Description		
6.	0				Direct Entry,		

Type III 24-hr Grafton-25yr Rainfall=6.16"
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Summary for Subcatchment A2: TO SWALE 2

Runoff

14.97 cfs @ 12.09 hrs, Volume=

51,147 cf, Depth> 5.34"

Area (sf)	CN	Description	
* 92,000	98	ROOF & PAVEMENT	
23,000	74	>75% Grass cover, Good, HSG C	
115,000 23,000 92,000	93	Weighted Average Pervious Area Impervious Area	
Tc Length (min) (feet)	Slop (ft/f		
		Direct Entry,	

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Summary for Subcatchment A3: TO SWALE 3

Runoff 5.24 cfs @ 12.09 hrs, Volume= 16,732 cf, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Grafton-25yr Rainfall=6.16"

	<u> </u>	rea (sf)	CN	Description						
*		16,600	98	ROOF & PA	ROOF & PAVEMENT					
		32,000	74	>75% Grass cover, Good, HSG C						
		48,600	82	Weighted A	verage			************************		
		32,000		Pervious Area						
		16,600		Impervious	pervious Area					
	Тс	Length	Slope	e Velocity	Capacity	Description				
(n	nin)	(feet)	(ft/ft) (ft/sec)	(cfs)	•				
	60					Direct Entry				

Direct Entry,

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Summary for Subcatchment D1: IMP / SITE

Runoff = 28.95 cfs @ 12.09 hrs, Volume=

93,934 cf, Depth> 4.56"

	Area	(ac)	CN	Des							
	0.	.836	74	>759	% Grass co	over, Good	, HSG C				
	0.	742	61		% Grass cover, Good, HSG B						
*	0.	.745	98	ROC	OOF						
*	1.	.018	98	PAV	AVEMENT						
*	0.	0.574 98 FUTURE ROOF									
*	1.	1.148 98 FUTURE PAVMENT									
*	0.	0.614 68 FUTURE LAWN HSG B/C									
	5.	677	86	Weig	hted Aver	age					
	2.	192			ious Area	J					
	3.	485		Impe	ervious Are	a					
	Tc	Lengt	h S	Slope	Velocity	Capacity	Description				
	(min)	(fee	t)	(ft/ft)	(ft/sec)	(cfs)	-				
	6.0						Direct Entry,				

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Summary for Subcatchment D2: UNDETAINED TO AP1

6.10 cfs @ 12.09 hrs, Volume= Runoff

19,244 cf, Depth> 3.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Grafton-25yr Rainfall=6.16"

	Area	(ac)	CN	Desc	cription			
	0.	*****						
0.995 70 Woods, Good, HSG C								
	0.	163	80	>75%	% Grass co	over, Good,	HSG D	
0.308 74 >75% Grass cover, Good, HSG C								
	1.	647	73	Weig	hted Aver	age		_
					ious Area	-		
_	Tc (min)	Leng (fee		Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description	
	6.0						Direct Entry,	_

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Summary for Subcatchment D3: UNDETAINED TO AP2

Runoff = 8.28 cfs @ 12.10 hrs, Volume=

26,312 cf, Depth> 2.74"

Area	(sf) CN	Description	Description						
5,9	900 77	Woods, Go	od, HSG D						
64,	400 70	Woods, Go	od, HSG C						
21,	200 55	Woods, Go	od, HSG B						
10,	500 80	>75% Gras	s cover, Go	od, HSG D					
8,9	970 74	>75% Gras	s cover, Go	od, HSG C					
4,2	200 61	>75% Gras	s cover, Go	od, HSG B					
115,	170 68	Weighted A	verage						
115,	170	Pervious Ar	ea						
	ngth Slo		Capacity	Description					
	feet) (ft	/ft) (ft/sec)	(cfs)						
6.0				Direct Entry,					

Type III 24-hr Grafton-25yr Rainfall=6.16"

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Summary for Subcatchment D4: BASIN/LAWN

Runoff = 2.72 cfs @ 12.09 hrs, Volume=

8,612 cf, Depth> 3.72"

	Area (sf)	CN	Description								
	20,100	80	>75% Gras	>75% Grass cover, Good, HSG D							
	7,700	74	>75% Gras	75% Grass cover, Good, HSG C							
	27,800	78	Weighted Average								
	27,800 Pervious Area										
T i <u>mi)</u>	c Length	Slop (ft/f	•	Capacity (cfs)	Description						
6.	.0				Direct Entry,						

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Summary for Subcatchment EX1: AP1 EXIST PEAK

Runoff

15.71 cfs @ 12.16 hrs, Volume=

58,546 cf, Depth> 2.74"

*******	Area	(ac) (<u> Des</u>	cription		
				ds, Good,		
				ds, Good,		
	***************************************			ods, Good,		
			68 Wei	ghted Aver	age	
	5.	890	Perv	ious Area/	-	
	Tc	Length	Slope	,	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	•
	9.3	50	0.0400	0.09		Sheet Flow, a-b
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.8	530	0.0900	4.83		Shallow Concentrated Flow, b-c
						Unpaved Kv= 16.1 fps
	11.1	580	Total			· · · · · · · · · · · · · · · · · · ·

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Summary for Subcatchment EX2: AP2 EXIST PEAK

Runoff

= 12

12.96 cfs @ 12.12 hrs, Volume=

43,788 cf, Depth> 2.56"

Area	(ac) (ON Des	cription					
		55 Woo	ds, Good,	HSG B				
			ds, Good,					
0.650 77 Woods, Good, HSG D 4.720 66 Weighted Average								
4.	720	Perv	ious Area	age				
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
6.5	50	0.1000	0.13		Sheet Flow, a-b			
1.2	340	0.0800	4.55		Woods: Light underbrush n= 0.400 P2= 3.20" Shallow Concentrated Flow, b-c Unpaved Kv= 16.1 fps			
7.7	390	Total		*****	1001 100			

Type III 24-hr Grafton-25yr Rainfall=6.16"

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Summary for Reach S1: SWALE 1

Inflow Area = 21,700 sf, 58.53% Impervious, Inflow Depth > 4.78" for Grafton-25yr event

Inflow = 2.63 cfs @ 12.09 hrs, Volume= 8.638 cf

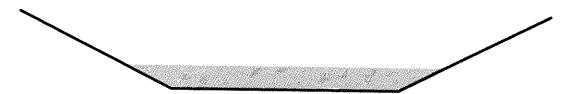
Outflow = 2.47 cfs @ 12.13 hrs, Volume= 8,623 cf, Atten= 6%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Max. Velocity= 2.33 fps, Min. Travel Time= 1.5 min

Avg. Velocity = 0.63 fps, Avg. Travel Time= 5.6 min

Peak Storage= 234 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.31' Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.19 cfs

 $3.00' \times 1.00'$ deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 210.0' Slope= 0.0095 '/' Inlet Invert= 408.00', Outlet Invert= 406.00'



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Stage-Area-Storage for Reach S1: SWALE 1

Elevation	End-Area	Storage	Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
408.00	0.0	0	408.53	2.2	452
408.01	0.0	6	408.54	2.2	463
408.02	0.1	13	408,55	2.3	474
408.03	0.1	19	408,56	2.3	485
408.04	0.1	26	408.57	2.4	496
408,05	0.2	33	408.58	2.4	507
408.06	0.2	39	408.59	2.5	518
408.07	0.2	46	408,60	2.5	529
408.08 408.09	0.3 0.3	53	408.61 408.62	2.6	541 550
408.09	0.3	60 67	408.63	2.6 2.7	552 564
408.10	0.3	74	408.64	2.7	575
408.12	0.4	82	408.65	2.8	587
408.13	0.4	89	408.66	2.9	599
408.14	0.5	96	408.67	2.9	611
408.15	0.5	104	408.68	3.0	623
408,16	0.5	112	408.69	3.0	635
408.17	0.6	119	408.70	3.1	647
408.18	0.6	127	408.71	3.1	659
408.19	0.6	135	408.72	3.2	671
408.20	0.7	143	408.73	3,3	684
408,21	0.7	151	408.74	3.3	696
408.22 408.23	0.8	159	408.75	3.4	709 701
408.24	0.8 0.8	167 175	408.76 408.77	3.4 3.5	721 734
408.25	0.8	184	408.77	3.6	734 747
408.26	0.9	192	408.79	3.6	760
408.27	1.0	201	408.80	3.7	773
408.28	1.0	209	408.81	3.7	786
408.29	1.0	218	408.82	3.8	799
408.30	1.1	227	408.83	3.9	812
408.31	1.1	236	408.84	3.9	826
408.32	1.2	245	408.85	4.0	839
408.33	1.2	254	408.86	4.1	852
408.34	1.3	263	408.87	4.1	866
408.35	1.3	272	408.88	4.2	880
408.36 408.37	1.3 1.4	281 291	408.89 408.90	4.3 4.3	893 907
408.38	1.4	300	408.90	4.4	907 921
408.39	1.5	310	408.92	4.5	935
408.40	1.5	319	408.93	4.5	949
408.41	1.6	329	408.94	4.6	963
408.42	1.6	339	408.95	4.7	978
408.43	1.7	349	408.96	4.7	992
408.44	1.7	359	408.97	4.8	1,006
408.45	1.8	369	408.98	4.9	1,021
408.46	1.8	379	408.99	4.9	1,035
408.47	1.9	389	409.00	5.0	1,050
408.48	1.9	399	-		
408.49 408.50	2.0 2.0	410 420	1		
408.50	2.0	431	-		
408.52	2.1	441	age of the same of		
	Aires 1	.,.	********		

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Summary for Reach S2: SWALE 2

Inflow Area = 115,000 sf, 80.00% Impervious, Inflow Depth > 5.34" for Grafton-25yr event

Inflow = 14.97 cfs @ 12.09 hrs, Volume= 51,147 cf

Outflow = 13.75 cfs @ 12.17 hrs, Volume= 50,984 cf, Atten= 8%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.62 fps, Min. Travel Time= 3.2 min Avg. Velocity = 1.03 fps, Avg. Travel Time= 11.1 min

Peak Storage= 2,628 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.70' Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.42 cfs

4.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 8.00' Length= 690.0' Slope= 0.0087 '/' Inlet Invert= 404.00', Outlet Invert= 398.00'

Stage-Area-Storage for Reach S2: SWALE 2

F 141			1 -		
	End-Area	Storage		End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
404.00 404.01	0.0 0.0	0	404.53	2.7	1,850
404.02	0.0	28 56	404.54	2.7	1,893
404.03	0.1	84	404.55	2.8	1,935
404.04	0.1	113	404.56	2.9	1,978
404.05	0.2	141	404.57 404.58	2.9	2,022
404.06	0.2	171	404.59	3.0 3.1	2,065
404.07	0.3	200	404.59	3.1	2,109
404.08	0.3	230	404.61	3.1	2,153 2,197
404.09	0.4	260	404.62	3.2	2,197
404.10	0.4	290	404.63	3,3	2,242
404.11	0.5	320	404.64	3.4	2,332
404.12	0.5	351	404.65	3.4	2,377
404.13	0.6	382	404.66	3.5	2,423
404.14	0.6	413	404.67	3.6	2,469
404.15	0.6	445	404.68	3.6	2,515
404.16	0.7	477	404.69	3.7	2,561
404.17	0.7	509	404.70	3.8	2,608
404.18	0.8	542	404.71	3.8	2,655
404.19	8.0	574	404.72	3.9	2,703
404.20	0.9	607	404.73	4.0	2,750
404.21	0.9	640	404.74	4.1	2,798
404.22	1.0	674	404.75	4.1	2,846
404.23	1.0	708	404.76	4.2	2,895
404.24	1.1	742	404.77	4.3	2,943
404.25	1.1	776	404.78	4.3	2,992
404.26 404.27	1.2	811	404.79	4.4	3,042
404.28	1.2 1.3	846 881	404.80	4.5	3,091
404.29	1.3	916	404.81	4.6	3,141
404.30	1.4	952	404.82 404.83	4.6 4.7	3,191
404.31	1.4	988	404.84	4.7 4.8	3,241
404,32	1.5	1,025	404.85	4.8	3,292 3,343
404.33	1.5	1,061	404.86	4.9	3,394 3,394
404.34	1.6	1,098	404.87	5.0	3,446
404.35	1,6	1,135	404.88	5.1	3,497
404.36	1.7	1,172	404.89	5.1	3,549
404.37	1.8	1,210	404.90	5.2	3,602
404.38	1.8	1,248	404.91	5.3	3,654
404.39	1.9	1,286	404.92	5.4	3,707
404.40	1.9	1,325	404.93	5.4	3,760
404.41	2.0	1,364	404.94	5.5	3,814
404.42	2.0	1,403	404.95	5.6	3,867
404.43	2.1	1,442	404.96	5.7	3,921
404.44	2.1	1,482	404.97	5,8	3,976
404.45	2.2	1,521	404.98	5.8	4,030
404.46	2.3	1,562	404.99	5.9	4,085
404.47 404.48	2.3 2.4	1,602	405.00	6.0	4,140
404.46	2.4	1,643 1,684			
404.49	2.4	1,084			
404.51	2.6	1,767			
404.52	2.6	1,808			
707,UZ	2.0	1,000			

Type III 24-hr Grafton-25yr Rainfall=6.16"

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Summary for Reach S3: SWALE 3

Inflow Area =

48,600 sf, 34.16% Impervious, Inflow Depth > 4.13" for Grafton-25yr event

inflow =

5.24 cfs @ 12.09 hrs, Volume=

16,732 cf

Outflow

4.89 cfs @ 12.16 hrs, Volume=

16,680 cf, Atten= 7%, Lag= 4.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.80 fps, Min. Travel Time= 2.6 min

Avg. Velocity = 0.82 fps, Avg. Travel Time= 8.9 min

Peak Storage= 773 cf @ 12.12 hrs, Average Depth at Peak Storage= 0.45' Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.68 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 7.00' Length= 440.0' Slope= 0.0091 '/'

Inlet Invert= 408.00', Outlet Invert= 404.00'

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Stage-Area-Storage for Reach S3: SWALE 3

Elevation End-Area Storage (feet) (sq-ft) (cubic-feet)	(feet) 408.53	End-Area (sq-ft)	Storage (cubic-feet)
100.00	408.53		(Cubic-reer)
408.00 0.0 0		2.2	947
408.01 0.0 13	408.54	2.2	969
408.02 0.1 27	408.55	2.3	992
408.03 0.1 40	408.56	2.3	1,015
408.04 0.1 54	408.57	2.4	1,038
408.05 0.2 68	408.58	2.4	1,062
408.06 0.2 82 408.07 0.2 97	408.59	2.5	1,085
408.07 0.2 97 408.08 0.3 111	408.60	2.5	1,109
408.09 0.3 126	408.61 408.62	2.6 2.6	1,133
408.10 0.3 141	408.63	2.0 2.7	1,157 1,181
408.11 0.4 156	408.64	2.7	1,205
408.12 0.4 171	408.65	2.8	1,230
408.13 0.4 186	408.66	2.9	1,255
408.14 0.5 202	408.67	2.9	1,279
408.15 0.5 218	408.68	3.0	1,305
408.16 0.5 234	408.69	3.0	1,330
408.17 0.6 250	408.70	3.1	1,355
408.18 0.6 266	408.71	3.1	1,381
408.19 0.6 283	408.72	3.2	1,407
408.20 0.7 299	408,73	3.3	1,433
408.21 0.7 316	408.74	3.3	1,459
408.22 0.8 333	408.75	3.4	1,485
408.23 0.8 350 408.24 0.8 367	408.76	3.4	1,511
408.24 0.8 367 408.25 0.9 385	408.77	3.5 3.6	1,538
408.26 0.9 403	408.78 408.79	3.6	1,565 1,592
408.27 1.0 421	408.80	3.7	1,619
408.28 1.0 439	408.81	3.7	1,647
408.29 1.0 457	408.82	3.8	1,674
408.30 1.1 475	408.83	3.9	1,702
408.31 1.1 494	408.84	3.9	1,730
408.32 1.2 513	408.85	4.0	1,758
408.33 1.2 531	408.86	4.1	1,786
408.34 1.3 551	408.87	4.1	1,814
408.35 1.3 570	408.88	4.2	1,843
408.36 1.3 589	408.89	4.3	1,872
408.37 1.4 609	408.90	4.3	1,901
408.38 1.4 629 408.39 1.5 649	408.91	4.4	1,930
408.39 1.5 649 408.40 1.5 669	408.92 408.93	4.5 4.5	1,959
408.41 1.6 689	408.94	4.6	1,989 2,018
408.42 1.6 710	408.95	4.7	2,048
408.43 1.7 730	408.96	4.7	2,078
408.44 1.7 751	408.97	4.8	2,108
408.45 1.8 772	408.98	4.9	2,139
408.46 1.8 793	408.99	4.9	2,169
408.47 1.9 815	409.00	5.0	2,200
408.48 1.9 836			
408.49 2.0 858			
408.50 2.0 880			
408.51 2.1 902			
408.52 2.1 924			

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Summary for Pond B1: BASIN 1

Inflow Area = 275,090 sf, 55.18% Impervious, Inflow Depth > 4.47" for Grafton-25yr event 102,546 cf

Outflow = 7.27 cfs @ 12.50 hrs, Volume= 0.43 cfs @ 12.50 hrs, Volume= 16,294 cf

Primary = 6.84 cfs @ 12.50 hrs, Volume= 75,085 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 396.98' @ 12.50 hrs Surf.Area= 18,720 sf Storage= 48,058 cf

Plug-Flow detention time= 184.1 min calculated for 91,190 cf (89% of inflow) Center-of-Mass det. time= 133.2 min (931.2 - 798.1)

Volume	Invert	Invert Avail.Storage		Storage Description				
#1	392.00'	69,3	89 cf	Custom Stage Dat	a (Irregular)Listed	below (Recalc)	_	
Elevatio		urf.Area F (sq-ft)	erim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)		
392.0	00	2,725	260.0	0	0	2,725		
394.0	00	4,390	310.0	7,049	7,049	5,063		
394.1	10	10,300	730.0	714	7,763	39,823		
396.0	00	14,960	840.0	23,860	31,623	53,647		
398.0	00	23,100	860.0	37,766	69,389	56,842		
Device	Routing	Invert	Outle	et Devices			_	
#1	Discarded	392.00'	1.00	0 in/hr Exfiltration o	over Horizontal ar	ea		
#2	Primary	396.80'		long x 12.0' breadti				
#3	Drimon	397.00'	Coe	d (feet) 0.20 0.40 0 f. (English) 2.57 2.6	2 2.70 2.67 2.66	2.67 2.66 2.64		
#3	Primary	397.00	Hea	long x 12.0' breadt d (feet) 0.20 0.40 0 f. (English) 2.57 2.6	0.60 0.80 1.00 1.2	20 1.40 1.60		
#4	Primary	394.00'	6.0"		t CMP, square ed	ge headwall, Ke= 0.500		
#5	Primary	395.50'		" x 20.0' long Culve et Invert= 395.00' S		dge headwall, Ke= 0.500 0.900 n= 0.013		

Discarded OutFlow Max=0.43 cfs @ 12.50 hrs HW=396.98' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.43 cfs)

Primary OutFlow Max=6.83 cfs @ 12.50 hrs HW=396.98' (Free Discharge)

2=Broad-Crested Rectangular Weir (Weir Controls 1.54 cfs @ 1.08 fps)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

-4=Culvert (Barrel Controls 1.55 cfs @ 7.89 fps)

-5=Culvert (Inlet Controls 3.74 cfs @ 4.76 fps)

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Stage-Area-Storage for Pond B1: BASIN 1

Elevation	Surface	Horizontal	Storage
(feet)	(sq-ft)	(sq-ft)	(cubic-feet)
392.00	2,725	2,725	0
392.20	2,874	2,874	560
392.40	3,026	3,026	1,150
392.60	3,183	3,183	1,771
392.80	3,344	3,344	2,423
393.00	3,508	3,508	3,108
393.20	3,677	3,677	3,827
393.40	3,849	3,849	4,579
393.60	4,025	4,025	5,367
393.80	4,206	4,206	6,190
394.00	4,390	4,390	7,049
394.20	10,524	10,524	8,804
394.40	10,978	10,978	10,954
394.60	11,442	11,442	13,196
394.80	11,916	11,916	15,532
395.00	12,399	12,399	17,963
395.20	12,892	12,892	20,492
395.40	13,395	13,395	23,121
395,60	13,907	13,907	25,851
395.80	14,429	14,429	28,684
396.00	14,960	14,960	31,623
396.20	15,695	15,695	34,688
396.40	16,447	16,447	37,902
396,60	17,217	17,217	41,268
396.80	18,005	18,005	44,790
397.00	18,810	18,810	48,471
397.20	19,633	19,633	52,315
397.40	20,473	20,473	56,325
397.60	21,331	21,331	60,505
397.80	22,207	22,207	64,859
398.00	23,100	23,100	69,389

Type III 24-hr Grafton-25yr Rainfall=6.16"

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Summary for Link AP1: ANALYSIS POINT 1

71,743 sf, 0.00% Impervious, Inflow Depth > 3.22" for Grafton-25yr event 6.10 cfs @ 12.09 hrs, Volume= 19,244 cf 6.10 cfs @ 12.09 hrs, Volume= 19,244 cf, Atten= 0%, Lag= 0.0 min Inflow Area =

Inflow =

Primary 19,244 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-25yr Rainfall=6.16"

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Summary for Link AP2: ANALYSIS POINT 2

115,170 sf, 0.00% Impervious, Inflow Depth > 2.74" for Grafton-25yr event 8.28 cfs @ 12.10 hrs, Volume= 26,312 cf 8.28 cfs @ 12.10 hrs, Volume= 26,312 cf, Atten= 0%, Lag= 0.0 min Inflow Area =

inflow =

Primary 26,312 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Subcatchment A1: TO SWALE 1

Runoff

1.16 cfs @ 12.09 hrs, Volume=

3,673 cf, Depth> 2.03"

_		rea (sf)	CN	Description							
*		12,700 9,000		ROOF & PAVEMENT >75% Grass cover, Good, HSG C							
		21,700 9,000 12,700		Weighted A Pervious Ar Impervious	verage ea						
*****	Tc (min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description					
	6.0					Direct Entry,					

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Summary for Subcatchment A2: TO SWALE 2

Runoff = 7.27 cfs @ 12.09 hrs, Volume=

23,790 cf, Depth> 2.48"

		rea (sf)	CN	Description							
*		92,000	98		ROOF & PAVEMENT -75% Grass cover, Good, HSG C						
		23,000	74	>/5% Gras							
	1	15,000 23,000 92,000	93	Pervious A	eighted Average ervious Area pervious Area						
	Tc (min)	Length (feet)	Slope (ft/ft	,	Capacity (cfs)	Description					
	6.0					Direct Entry,					

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Summary for Subcatchment A3: TO SWALE 3

Runoff = 2.01 cfs @ 12.09 hrs, Volume=

6,354 cf, Depth> 1.57"

		rea (sf)	CN	Description							
*		16,600	98	ROOF & PAVEMENT							
		32,000	74								
	48,600 82 Weighted Average 32,000 Pervious Area 16,600 Impervious Area										
(I	Tc min)	Length (feet)	Slop (ft/f		Capacity (cfs)	Description					
	6.0					Direct Entry,					

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Subcatchment D1: IMP / SITE

Runoff = 12.19 cfs @ 12.09 hrs, Volume=

38,501 cf, Depth> 1.87"

Area (ac) CN Description											
	0.	836	74	>759	% Grass co	over, Good	HSG C				
	0.	742	61	>759	% Grass co	over, Good	HSG B				
*	0.	745	98	ROC	ROOF						
*	1.	018 98 PAVEMENT									
*	0.	0.574 98 FUTURE ROOF									
*	1.	1.148 98 FUTURE PAVMENT									
*	0.	614	68	FUT	URE LAW	N HSG B/C					
	5.677			Weig	hted Aver						
	2.192				ious Area	J					
	3.485			Impe	ervious Are	a					
				•							
	Tc	Leng	th	Slope	Velocity	Capacity	Description				
	(min)	(fe€	et)	(ft/ft)	(ft/sec)	(cfs)	•				
	6.0						Direct Entry,				

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Summary for Subcatchment D2: UNDETAINED TO AP1

Runoff

1.80 cfs @ 12.10 hrs, Volume=

6,022 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Type III 24-hr Grafton-2yr Rainfall=3.24"

	Area	(ac)	CN	Desc	cription			
0.181 77			Woo	Woods, Good, HSG D				
	0.	995	70	Woo	ds, Good,	HSG C		
	0.	163	80	>75%	% Grass co	over, Good,	HSG D	
_	0.	308	74	>759	% Grass co	over, Good,	, HSG C	
	1.	647	73	Weig	ted Aver	age		
	1.	647		Perv	ious Area			
	Tc	Leng		Slope	Velocity	Capacity	Description	
	<u>(min)</u>	(fee	<u>≥t)</u>	<u>(ft/ft)</u>	(ft/sec)	(cfs)		
	6.0						Direct Entry	

6.0

Direct Entry,

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Subcatchment D3: UNDETAINED TO AP2

Runoff =

1.99 cfs @ 12.11 hrs, Volume=

7,231 cf, Depth> 0.75"

A	rea (sf)	CN	Description			
	5,900 77 Woods, Good, HSG D					
	64,400	70	Woods, Go	od, HSG C		
	21,200	55	Woods, Go	od, HSG B		
	10,500	80	>75% Gras	s cover, Go	od, HSG D	
	8,970	74	>75% Gras	s cover, Go	od, HSG C	
	4,200	61	>75% Gras	s cover, Go	od, HSG B	
1	15,170	68	Weighted A	verage		
1	15,170		Pervious Ar	ea		
Tc	Length	Slope	•	Capacity	Description	
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)		
6.0					Direct Entry,	

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Subcatchment D4: BASIN/LAWN

Runoff = 0.94 cfs @ 12.10 hrs, Volume=

3,015 cf, Depth> 1.30"

_	Α	rea (sf)	CN	Description			
		20,100	80	>75% Gras	s cover, Go	od, HSG D	
		7,700	74	>75% Gras	s cover, Go	od, HSG C	
		27,800	27,800 78 Weighted Average				
		27,800		Pervious Ar	_		
	Tc (min)	Length (feet)	Slop (ft/f		Capacity (cfs)	Description	
		(leet)	(IUI	i) (insec)	(CIS)		
	6.0					Direct Entry,	

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Summary for Subcatchment EX1: AP1 EXIST PEAK

Runoff = 3.69 cfs @ 12.18 hrs, Volume=

16,082 cf, Depth> 0.75"

_	Area	(ac) C	N Des	cription		
_	1.	210	55 Woo	ods, Good,	HSG B	
	4.	160	70 Woo	ods, Good,	HSG C	
_	0.	520	77 Woo	ods, Good,	HSG D	
	5.	890	68 Wei	ghted Aver	age	
	5.	.890	Pen	<i>i</i> ious Area	-	
	Tc	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	9.3	50	0.0400	0.09		Sheet Flow, a-b
						Woods: Light underbrush n= 0.400 P2= 3.20"
	1.8	530	0.0900	4.83		Shallow Concentrated Flow, b-c
						Unpaved Kv= 16.1 fps
~	11.1	580	Total			

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Summary for Subcatchment EX2: AP2 EXIST PEAK

Runoff = 2.74 cfs @ 12.14 hrs, Volume=

11,342 cf, Depth> 0.66"

	Area	(ac) C	N Des	cription		
_	1.	650	55 Woo	ods, Good,	HSG B	
	2.	420	70 Woo	ods, Good,	HSG C	
	0,	650	77 Woo	ods, Good,	HSG D	
	4.	720	66 Wei	ghted Aver	age	
	4.	720	Per	vious Area		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
_	6.5	50	0.1000	0.13		Sheet Flow, a-b Woods: Light underbrush n= 0.400 P2= 3.20"
	1.2	340	0.0800	4.55		Shallow Concentrated Flow, b-c Unpaved Kv= 16.1 fps
	7.7	390	Total			

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Summary for Reach S1: SWALE 1

Inflow Area = 21,700 sf, 58.53% Impervious, Inflow Depth > 2.03" for Grafton-2yr event

Inflow = 1.16 cfs @ 12.09 hrs, Volume= 3,673 cf

Outflow = 1.09 cfs @ 12.15 hrs, Volume= 3,664 cf, Atten= 6%, Lag= 3.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.75 fps, Min. Travel Time= 2.0 min Avg. Velocity = 0.49 fps, Avg. Travel Time= 7.1 min

Peak Storage= 134 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.19' Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.19 cfs

 $3.00' \times 1.00'$ deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= $2.0 \, '/'$ Top Width= 7.00'

Length= 210.0' Slope= 0.0095 '/'

Inlet invert= 408.00', Outlet invert= 406.00'

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Stage-Area-Storage for Reach S1: SWALE 1

Elevation E		Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
(feet) 408.00	(sq-ft) 0.0	0	408.53	2.2	452
408.01	0.0	6	408.54	2.2	463
408.02	0.1	13	408.55	2.3	474
408.03	0.1	19	408,56	2.3	485
408.04	0.1	26	408.57	2.4	496
408.05	0.2	33	408.58	2.4	507
408.06	0.2	39	408.59	2.5	518 520
408.07 408.08	0.2 0.3	46 53	408.60 408.61	2.5 2.6	529 541
408.09	0.3	60	408.62	2.6	552
408.10	0.3	67	408.63	2.7	564
408.11	0.4	74	408.64	2.7	575
408.12	0.4	82	408.65	2.8	587
408.13	0.4	89	408.66	2.9	599
408.14	0.5	96	408.67	2.9	611
408.15	0.5 0.5	104 112	408.68	3.0 3.0	623 635
408.16 408.17	0.5	119	408.69 408.70	3.0 3.1	647
408.18	0.6	127	408.71	3.1	659
408.19	0.6	135	408.72	3.2	671
408.20	0.7	143	408.73	3.3	684
408.21	0.7	151	408.74	3.3	696
408.22	8.0	159	408.75	3.4	709
408.23	0.8	167	408.76	3.4	721 724
408.24 408.25	0.8 0.9	175 184	408.77 408.78	3.5 3.6	734 747
408.26	0.9	192	408.79	3.6	760
408.27	1.0	201	408.80	3.7	773
408.28	1.0	209	408.81	3.7	786
408.29	1.0	218	408.82	3.8	799
408.30	1.1	227	408.83	3.9	812
408.31	1.1	236	408.84	3.9	826
408.32 408.33	1.2 1.2	245 254	408.85 408.86	4.0 4.1	839 852
408.34	1.3	263	408.87	4.1	866
408.35	1.3	272	408.88	4.2	880
408.36	1.3	281	408.89	4.3	893
408.37	1.4	291	408.90	4.3	907
408.38	1.4	300	408.91	4.4	921
408.39	1.5	310	408.92	4.5	935
408.40 408.41	1.5 1.6	319 329	408.93 408.94	4.5 4.6	949 963
408.42	1.6	339	408.95	4.7	978
408.43	1.7	349	408.96	4.7	992
408.44	1.7	359	408.97	4.8	1,006
408.45	1.8	369	408.98	4.9	1,021
408.46	1.8	379	408.99	4.9	1,035
408.47	1.9	389	409.00	5.0	1,050
408.48 408.49	1.9 2.0	399 410			
408.49	2.0	420	1		
408.51	2.1	431			
408.52	2.1	441			
			1		

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Summary for Reach S2: SWALE 2

Inflow Area = 115,000 sf, 80.00% Impervious, Inflow Depth > 2.48" for Grafton-2yr event

Inflow = 7.27 cfs @ 12.09 hrs, Volume= 23,790 cf

Outflow = 6.39 cfs @ 12.20 hrs, Volume= 23,682 cf, Atten= 12%, Lag= 6.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.86 fps, Min. Travel Time= 4.0 min Avg. Velocity = 0.80 fps, Avg. Travel Time= 14.3 min

Peak Storage= 1,564 cf @ 12.13 hrs, Average Depth at Peak Storage= 0.46' Bank-Full Depth= 1.00', Capacity at Bank-Full= 26.42 cfs

4.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 '/' Top Width= 8.00' Length= 690.0' Slope= 0.0087 '/' Inlet Invert= 404.00', Outlet Invert= 398.00'

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Stage-Area-Storage for Reach S2: SWALE 2

Elevation	End-Area	Storage	Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
404.00	0.0	Ó	404.53	2.7	1,850
404.01	0.0	28	404.54	2.7	1,893
404.02	0.1	56	404.55	2.8	1,935
404.03	0.1	84	404.56	2.9	1,978
404.04	0.2	113	404.57	2.9	2,022
404.05	0.2	141	404.58	3.0	2,065
404.06	0.2	171	404.59	3.1	2,109
404.07	0.3	200	404.60	3.1	2,153
404.08	0.3	230	404.61	3.2	2,197
404.09	0.4	260	404.62	3.2	2,242
404.10	0.4	290	404.63	3.3	2,287
404.11	0,5	320	404.64	3.4	2,332
404.12	0.5	351	404.65	3.4	2,377
404.13	0.6	382	404.66	3.5	2,423
404.14	0.6	413	404.67	3.6	2,469
404.15	0.6	445 477	404.68	3.6 3.7	2,515 2,561
404.16 404.17	0.7 0.7	477 509	404.69 404.70	3.7 3.8	2,50 t 2,608
404.17	0.7	542	404.70	3.8	2,655
404.10		574	404.71	3.9	2,703
404.19		607	404.72	4.0	2,750
404.20	0.9	640	404.74	4.1	2,798
404.22		674	404.75	4.1	2,846
404.23		708	404.76	4.2	2,895
404.24		742	404.77	4.3	2,943
404.25		776	404.78	4.3	2,992
404.26		811	404.79	4.4	3,042
404.27		846	404.80	4.5	3,091
404.28	1.3	881	404.81	4.6	3,141
404.29	1.3	916	404.82	4.6	3,191
404.30	1.4	952	404.83	4.7	3,241
404.31	1.4	988	404.84	4.8	3,292
404.32		1,025	404.85	4.8	3,343
404.33		1,061	404.86	4.9	3,394
404.34		1,098	404.87	5.0	3,446
404.35		1,135	404.88	5.1	3, 4 97
404.36		1,172	404.89		3,549
404.37		1,210	404.90	5.2 5.3	3,602
404.38		1,248 1,286	404.91 404.92	5.3 5.4	3,654 3,707
404.39 404.40		1,260 1,325	404.92	5.4	3,760
404.40		1,364	404.94	5.5	3,814
404.42		1,403	404.95		3,867
404.43		1,442	404.96		3,921
404.44		1,482	404.97	5.8	3,976
404.45		1,521	404.98		4,030
404.46		1,562	404.99		4,085
404.47		1,602	405.00		4,140
404.48		1,643	-		,
404.49		1,684			
404.50		1,725			
404.51	2.6	1,767			
404.52	2.6	1,808			

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Reach S3: SWALE 3

48,600 sf, 34.16% Impervious, Inflow Depth > 1.57" for Grafton-2yr event Inflow Area = Inflow

2.01 cfs @ 12.09 hrs, Volume= 6,354 cf

Outflow 1.79 cfs @ 12.20 hrs, Volume= 6,321 cf, Atten= 11%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.03 fps, Min. Travel Time= 3.6 min Avg. Velocity = 0.63 fps, Avg. Travel Time= 11.7 min

Peak Storage= 393 cf @ 12.14 hrs, Average Depth at Peak Storage= 0.25' Bank-Full Depth= 1.00', Capacity at Bank-Full= 21.68 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, grassed & winding Side Slope Z-value= 2.0 "Top Width= 7.00" Length= 440.0' Slope= 0.0091 '/' Inlet Invert= 408.00', Outlet Invert= 404.00'



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Stage-Area-Storage for Reach S3: SWALE 3

Elevation	End-Area	Storage	Elevation	End-Area	Storage
(feet)	(sq-ft)	(cubic-feet)	(feet)	(sq-ft)	(cubic-feet)
408.00	0.0	Ó	408.53	2.2	947
408.01	0.0	13	408.54	2.2	969
408.02	0.1	27	408.55	2.3	992
408.03	0.1	40	408.56	2.3	1,015
408.04	0.1	54	408.57	2.4	1,038
408.05	0.2	68	408.58	2.4	1,062
408.06	0.2	82	408.59	2.5	1,085
408.07	0.2	97	408.60	2.5	1,109
408.08	0.3	111	408.61	2.6	1,133
408.09	0.3	126	408.62	2.6	1,157
408.10	0.3	141	408.63	2.7	1,181
408.11	0.4	156	408.64	2.7	1,205
408.12	0.4	171	408.65	2.8	1,230
408,13	0.4	186	408.66	2.9	1,255
408.14 408.15	0.5 0.5	202	408.67	2.9	1,279
408.15	0.5	218 234	408.68	3.0	1,305
408.17	0.6	254 250	408.69	3.0	1,330
408.18	0.6	266	408.70 408.71	3.1 3.1	1,355
408.19	0.6	283	408.72	3.1	1,381 1,407
408.20	0.7	299	408.73	3.3	1,433
408.21	0.7	316	408.74	3.3	1,459
408.22	0.8	333	408.75	3.4	1,485
408.23	0.8	350	408.76	3.4	1,511
408.24	0.8	367	408.77	3,5	1,538
408.25	0.9	385	408.78	3.6	1,565
408,26	0,9	403	408.79	3.6	1,592
408.27	1.0	421	408.80	3.7	1,619
408.28	1.0	439	408.81	3.7	1,647
408.29	1.0	457	408.82	3.8	1,674
408.30	1.1	475	408.83	3.9	1,702
408.31	1.1	494	408.84	3.9	1,730
408.32 408.33	1.2 1.2	513 531	408.85	4.0	1,758
408.34	1.3	551	408.86 408.87	4.1 4.1	1,786
408.35	1.3	570	408.88	4.2	1,814 1,843
408.36	1.3	589	408.89	4.3	1,872
408.37	1.4	609	408.90	4.3	1,901
408,38	1.4	629	408.91	4,4	1,930
408.39	1.5	649	408.92	4.5	1,959
408.40	1.5	669	408.93	4.5	1,989
408.41	1.6	689	408.94	4.6	2,018
408.42	1.6	710	408.95	4.7	2,048
408.43	1.7	730	408.96	4.7	2,078
408.44	1.7	751	408.97	4.8	2,108
408.45	1.8	772	408.98	4.9	2,139
408.46	1.8	793	408.99	4.9	2,169
408.47	1.9	815	409.00	5.0	2,200
408.48 408.49	1.9	836 858			
408.50	2.0 2.0	858 880			
408.50	2.1	902			
408.52	2.1	924			
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Summary for Pond B1: BASIN 1

Inflow Area = 275,090 sf, 55.18% Impervious, Inflow Depth > 1.81" for Grafton-2yr event Inflow 13.13 cfs @ 12.09 hrs, Volume= 41.516 cf Outflow 1.24 cfs @ 13.07 hrs, Volume= 33,815 cf, Atten= 91%, Lag= 58.6 min Discarded = 0.30 cfs @ 13.07 hrs, Volume= 12,396 cf Primary 0.94 cfs @ 13.07 hrs, Volume= 21,419 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 395.24' @ 13.07 hrs Surf.Area= 12,988 sf Storage= 20,991 cf

Plug-Flow detention time= 231.3 min calculated for 33,815 cf (81% of inflow) Center-of-Mass det. time= 157.4 min (980.7 - 823.4)

Volume	lnv	ert Avail.s	Storage	Storage Description	n.m.	
#1	392.0		,389 cf	Custom Stage Da	ata (Irregular)Liste	ed below (Recalc)
Elevati (fe 392.	et)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
394. 394. 396.0 398.0	00 10 00	2,725 4,390 10,300 14,960 23,100	260.0 310.0 730.0 840.0 860.0	0 7,049 714 23,860 37,766	0 7,049 7,763 31,623 69,389	2,725 5,063 39,823 53,647 56,842
Device #1	Routing Discarded	inver		et Devices		
#2	Primary	392.00 396.80	8.0'1) in/hr Exfiltration ong x 12.0' breadt	h Broad Croated	David
#3	Primary	397.00	Coef. 5.0' le Head	(English) 2.57 2.6 ong x 12.0' breadt (feet) 0.20 0.40 (52 2.70 2.67 2.66 h Broad-Crested	20 1.40 1.60 3 2.67 2.66 2.64 Rectangular Weir
#4	Primary	394.00	6.0"	X 20.0' long Culve	4 2.70 2.67 2.66	2.67 2.66 2.64
#5	Primary	395.50'	12.0"		TU.UZSU / CC= (J.900 n= 0.013

Discarded OutFlow Max=0.30 cfs @ 13.07 hrs HW=395.24' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.94 cfs @ 13.07 hrs HW=395.24' (Free Discharge)

-2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

-3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

-4=Culvert (Inlet Controls 0.94 cfs @ 4.79 fps)

-5=Culvert (Controls 0.00 cfs)

2016-063-grafton

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Stage-Area-Storage for Pond B1: BASIN 1

		-	
Elevation (feet)	Surface (sq-ft)	Horizontal	Storage
392.00	2,725	(sq-ft)	(cubic-feet)
392.20	2,874	2,725	0
392,40	3,026	2,874	560
392.60	3,183	3,026	1,150
392.80	3,344	3,183	1,771
393.00	3,508	3,344	2,423
393.20	3,677	3,508	3,108
393.40	3,849	3,677	3,827
393.60	4,025	3,849	4,579
393.80	4,206	4,025	5,367
394.00	4,390	4,206	6,190
394.20	10,524	4,390	7,049
394.40	10,978	10,524	8,804
394.60	11,442	10,978	10,954
394.80	11,916	11,442	13,196
395.00	12,399	11,916	15,532
395.20	12,892	12,399	17,963
395.40	13,395	12,892	20,492
395.60	13,907	13,395	23,121
395.80	14,429	13,907	25,851
396.00	14,960	14,429	28,684
396.20	15,695	14,960 15,005	31,623
396.40	16,447	15,695 16,447	34,688
396.60	17,217	16,447	37,902
396.80	18,005	17,217	41,268
397.00	18,810	18,005	44,790
397.20	19,633	18,810	48,471
397.40	20,473	19,633	52,315
397.60	21,331	20,473	56,325
397.80	22,207	21,331	60,505
398.00	23,100	22,207	64,859
	_0,.00	23,100	69,389

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Link AP1: ANALYSIS POINT 1

Inflow Area = Inflow

71,743 sf, 0.00% Impervious, Inflow Depth > 1.01" for Grafton-2yr event 1.80 cfs @ 12.10 hrs, Volume= 6,022 cf 12.10 hrs, Volume= 6,022 cf, Atten= 0%, Lag= 0.0 min Primary =

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Type III 24-hr Grafton-2yr Rainfall=3.24"

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Summary for Link AP2: ANALYSIS POINT 2

Inflow Area = 115,170 sf, 0.00% Impervious, Inflow Depth > 0.75" for Grafton-2yr event inflow = 1.99 cfs @ 12.11 hrs, Volume= 1.99 cfs @ 12.11 hrs, Volume= Primary = 7,231 cf

7,231 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

. LAMAAA.

ERIC J. BAZZETT CHYL No. 35805 ENJOYAL FROM Signature and Date 8 MILLENNIUM DR GRAFTON	
Checklist	

red	ject Type: Is the application for new development, redevelopment, or a mix of new and evelopment? New development
	Redevelopment
	Mix of New Development and Redevelopment



Checklist (continued)
LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:
No disturbance to any Wetland Resource Areas
☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
Reduced Impervious Area (Redevelopment Only)
Minimizing disturbance to existing trees and shrubs
☐ LID Site Design Credit Requested:
Credit 1
☐ Credit 2
Credit 3
Use of "country drainage" versus curb and gutter conveyance and pipe
☐ Bioretention Cells (includes Rain Gardens)
Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
☐ Treebox Filter
☐ Water Quality Swale
☐ Grass Channel
☐ Green Roof
Other (describe):
Standard 1: No New Untreated Discharges
No new untreated discharges
Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

Checklist (continued) Standard 2: Peak Rate Attenuation Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding. Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm. Calculations provided to show that post-development peak discharge rates do not exceed predevelopment rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24hour storm. Standard 3: Recharge Soil Analysis provided. Required Recharge Volume calculation provided. Required Recharge volume reduced through use of the LID site Design Credits. Sizing the infiltration, BMPs is based on the following method: Check the method used. Simple Dynamic Dynamic Field ☐ Static Runoff from all impervious areas at the site discharging to the infiltration BMP. Runoff from all impervious areas at the site is not discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume. Recharge BMPs have been sized to infiltrate the Required Recharge Volume only to the maximum extent practicable for the following reason: Site is comprised solely of C and D soils and/or bedrock at the land surface M.G.L. c. 21E sites pursuant to 310 CMR 40.0000 Solid Waste Landfill pursuant to 310 CMR 19.000 Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable. Calculations showing that the infiltration BMPs will drain in 72 hours are provided. Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

¹ 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



Che	ecklist (continued)
Stand	dard 3: Recharge (continued)
у.	he infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10- ear 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding nalysis is provided.
	ocumentation is provided showing that infiltration BMPs do not adversely impact nearby wetland esource areas.
Stan	dard 4: Water Quality
	cong-Term Pollution Prevention Plan typically includes the following: Good housekeeping practices; Provisions for storing materials and waste products inside or under cover; Provisions for routine inspections and maintenance of stormwater BMPs; Bequirements for routine inspections and maintenance of stormwater BMPs; Boill prevention and response plans; Provisions for maintenance of lawns, gardens, and other landscaped areas; Requirements for storage and use of fertilizers, herbicides, and pesticides; Provisions for operation and management of septic systems; Provisions for solid waste management of septic systems; Provisions for solid waste management; Bonow disposal and plowing plans relative to Wetland Resource Areas; Minter Road Salt and/or Sand Use and Storage restrictions; Street sweeping schedules; Provisions for prevention of illicit discharges to the stormwater management system; Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL; Fraining for staff or personnel involved with implementing Long-Term Pollution Prevention Plan; List of Emergency contacts for implementing Long-Term Pollution Prevention Plan; List of Emergency contacts for implementing Long-Term Pollution Prevention Plan. A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent. Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge: is within the Zone II or Interim Wellhead Protection Area is near or to other critical areas is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
	The Required Water Quality Volume is reduced through use of the LID site Design Credits.
<u> </u>	Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if



Checklist (continued)
Standard 4: Water Quality (continued)
The BMP is sized (and calculations provided) based on:
The ½" or 1" Water Quality Volume or
The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.
Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)
 The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report. The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted <i>prior</i> to the discharge of stormwater to the post-construction stormwater BMPs.
The NPDES Multi-Sector General Permit does <i>not</i> cover the land use.
LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
All exposure has been eliminated.
All exposure has <i>not</i> been eliminated and all BMPs selected are on MassDEP LUHPPL list.
The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.
Standard 6: Critical Areas
The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
Critical areas and BMPs are identified in the Stormwater Report.



Cr	leckiist (continued)
ext	ndard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum ent practicable The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
	☐ Limited Project
	 Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area. Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
	☐ Bike Path and/or Foot Path
	Redevelopment Project
	Redevelopment portion of mix of new and redevelopment.
	Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report. The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.
Sta	andard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control
	Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the owing information:
	 Narrative; Construction Period Operation and Maintenance Plan; Names of Persons or Entity Responsible for Plan Compliance; Construction Period Pollution Prevention Measures; Erosion and Sedimentation Control Plan Drawings; Detail drawings and specifications for erosion control BMPs, including sizing calculations; Vegetation Planning; Site Development Plan; Construction Sequencing Plan; Sequencing of Erosion and Sedimentation Controls; Operation and Maintenance of Erosion and Sedimentation Controls; Inspection Schedule; Maintenance Schedule; Inspection and Maintenance Log Form.
	A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



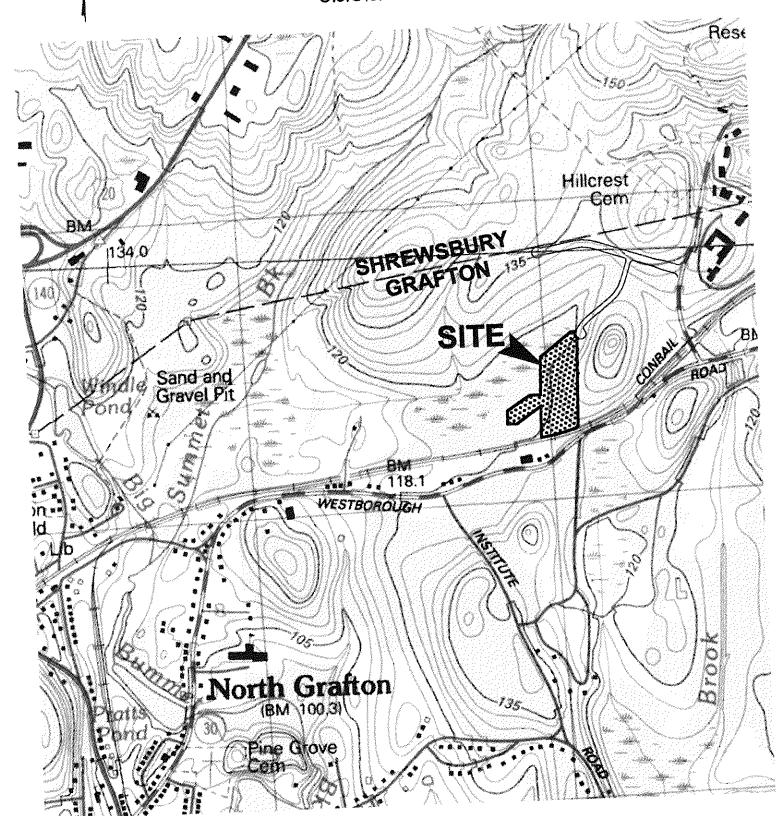
Checklist (continued)
Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)
The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has <i>not</i> been included in the Stormwater Report but will be submitted <i>before</i> land disturbance begins.
The project is <i>not</i> covered by a NPDES Construction General Permit.
The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the
Stormwater Report. The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.
Standard 9: Operation and Maintenance Plan
The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
☑ Name of the stormwater management system owners;
Party responsible for operation and maintenance;
Schedule for implementation of routine and non-routine maintenance tasks;
Plan showing the location of all stormwater BMPs maintenance access areas;
Description and delineation of public safety features;
Estimated operation and maintenance budget; and
☑ Operation and Maintenance Log Form.
The responsible party is not the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.
Standard 10: Prohibition of Illicit Discharges
☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
An Illicit Discharge Compliance Statement is attached;
NO Illicit Discharge Compliance Statement is attached but will be submitted <i>prior to</i> the discharge of any stormwater to post-construction BMPs.

HERITAGE DESIGN GROUP

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WHITINSMILE, MASSACHUSETTS 01588
TEL 508-266-2066 - FAX 508-266-2061

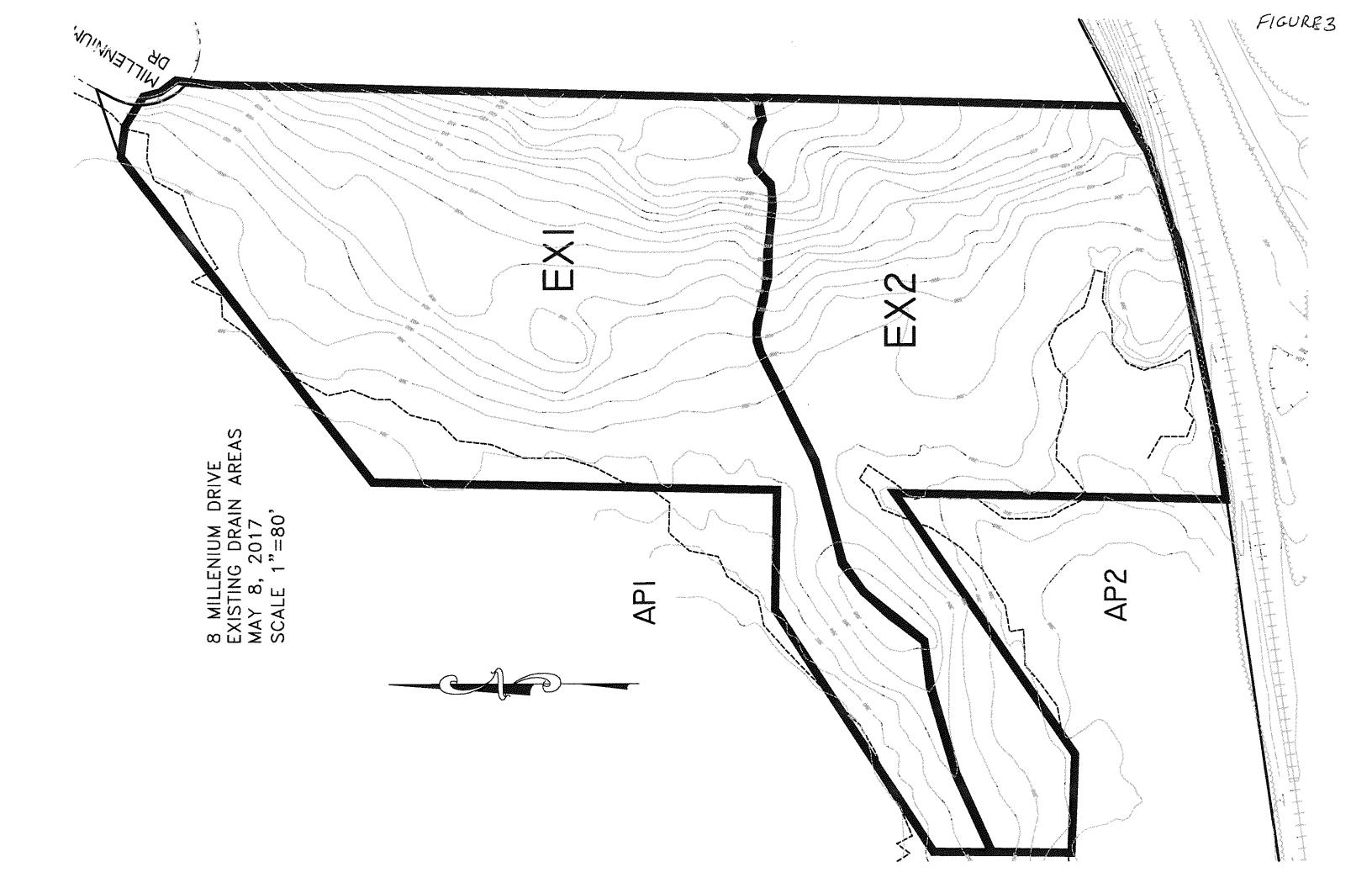
GRAFTON MASSACHUSETTS U.S.G.S. MAPPING

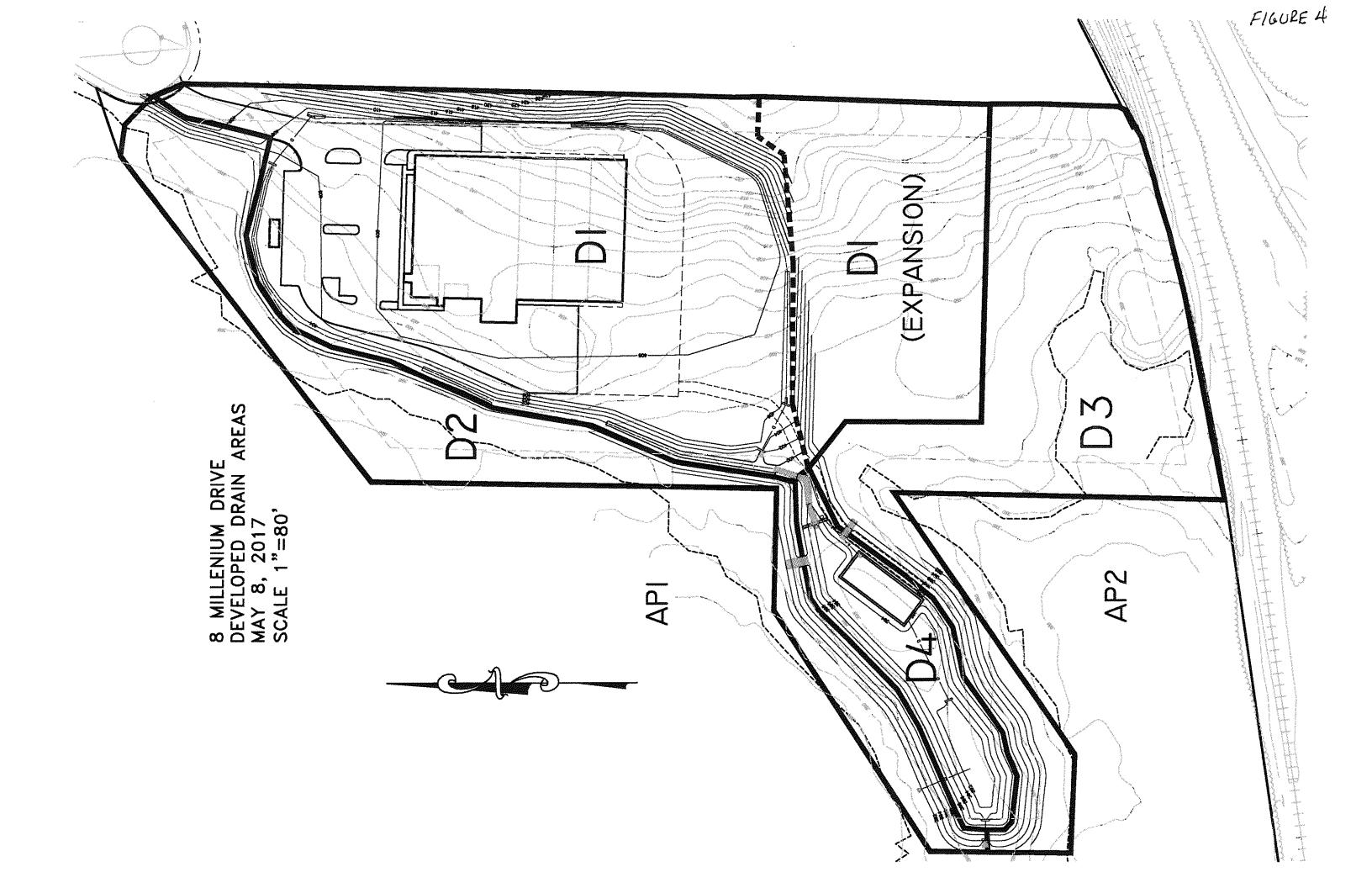


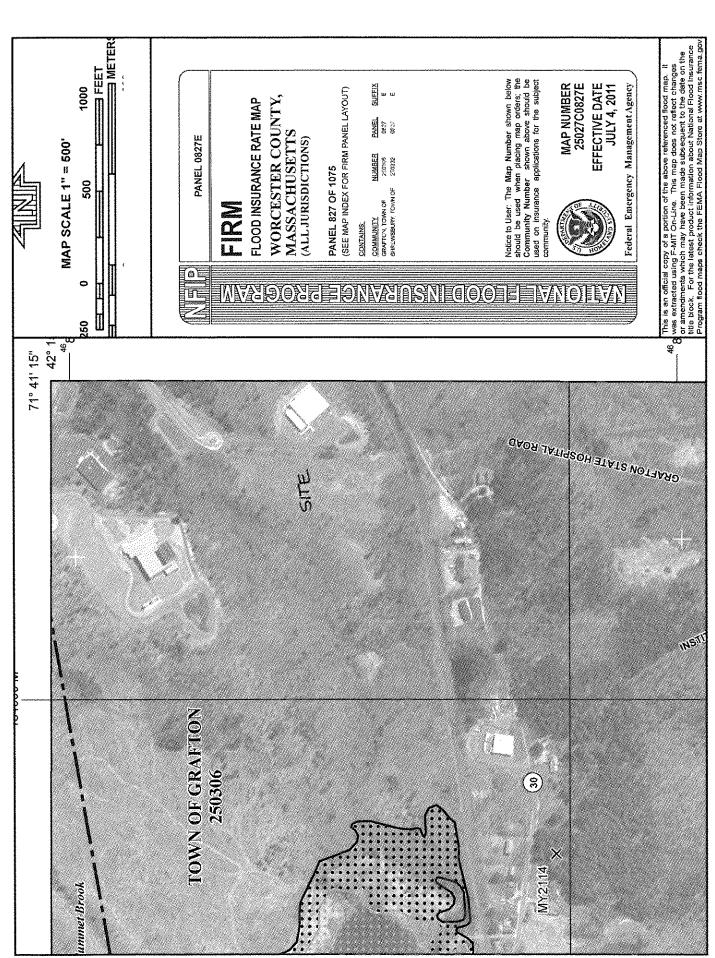
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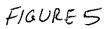
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Extreme Precipitation Tables

Northeast Regional Climate Center Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Fri, 31 Mar 2017 08:02:52 -0400 71.690 degrees West 42.247 degrees North 0 feet Yes Smoothing State
Location
Longitude
Latitude
Elevation
Date/Time

Extreme Precipitation Estimates

- Control (minimum)	Carried and a second se	poin	-		-			t-manner conservations	Pens	di-	Control of the Park of the Par	A mention and the second	-	Successive Contract of the Con		Š.	The second second second	A CONTRACTOR OF THE PROPERTY O	economic de la constantina della constantina del		ATTORNEY OF THE PROPERTY OF THE PARTY OF THE
section in the company of the compan	Smin		15min	a bettermine		hammed (· voidelle	·		,	- deviye and		48hr		lday	2day	4day	7day		
1yr	0.28		0.53	0.70	0.87	1.10	ly.	Maintiful Confidence,	Anna Se MANGENIA	decement of the second	admid to the INV	daire-co-	бесинтиуской	2.89	ħ	2.35	2.78	3.20	3.89		lyr
2yr	0.35	0.54	0.67	0.88	1.11	1.40	2yr	0.96	1.28	1.62	2.04	2.57	3.24	3.50	2ут	2.86	3.36	3.86	4.58	5.22	2yr
5yr	0.41		08.0	1.07	1.37	1.35	Syr	Padanistusena)	***************************************			-committee of source and	-	4.44	5yr	3.62	4.27	4.90	5.76		5yr
10yr	0.46	WHEN THE PARTY NAMED IN	0.92	1.25	1.62	2.08	10yr	hidrager (#1944)	(constant)	manusary	commission.	,	rousic cicerose	5.33	10yr	4.31	5.13	5.87	6.84		10yr
25yr	0.55	••••••	1.10	1.52	2.01	2.61	25yr	gratuary correct	***************************************	Secretary of Property	Samuel Control	CHARLES PROPERTY.	SPECIFICATION OF STREET	6.79	25yr	5.45	6.53	7.45	8.61		25yr
50yr	0.61	terrenania entrant	1.26	1.76	2.37	3.12	50yr	************	CIPLIOTOTON	harana d	-	***************************************		8.15	50yr	6.52	7.84	8.93	10.24		50yr
100yr	0.70	() (ap toquerun)	1.46	2.06	2.80	3.70	100yr	African Martin	*******	Vandelinger versteren.		(treestand)	ANNESS MANAGEMENT	9.80	100yr	7.79	9.42	10,71	12.18		100yr
200yr	0.79	oungumé.	1.67	2.40	3.31	4.41	200yr	Common Name (Appendance of the second	herman and	A recommendation of the contract of	Succession	Survey 13 A VA estima	11.78	200yr	9.32	11.33	12.84	14.51		200yr
500yr	0.95	***************************************	2.03	2.95	4.14	5.56	500yr	- interviewed	Contract Contract of			- wear		15.04	500yr	11.81	14.46	16.34	18.28		500yr
									,	•			ì					intercental transfer of the control		Control of the Contro	

CORNELL RAINFALL DATA

